

# PFAS Sampling Report

Taranaki Regional Council Groundwater Monitoring Sites, Landfills,  
and Wastewater Treatment Plant

## PFAS Sampling Report

Taranaki Regional Council Groundwater Monitoring Sites, Landfills, and Wastewater Treatment Plant

Client: Taranaki Regional Council

Co No.: N/A

Prepared by

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## Quality Information

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## 1.0 Introduction

This report has been prepared for Taranaki Regional Council (TRC) by AECOM New Zealand Limited (AECOM) in accordance with the proposal dated 11 July 2018. It documents sampling for per- and poly-fluoroalkyl substances (PFAS) undertaken on 6 and 7 August 2018 which comprised sampling of groundwater from selected monitoring wells around the Taranaki region, leachate from the Colson Road and Hawera landfills, and wastewater and bioboost (treated sludge) from the New Plymouth Wastewater Treatment Plant (the Sites).

The locations of the Sites are presented on **Figure 1**.

### 1.1 Objective

The objective of the sampling was to undertake an initial screen for the presence of PFAS in groundwater, leachate, wastewater, and bioboost at the Sites.

## 2.0 Site Information

Location details for the Sites are summarised in **Table 1** below.

**Table 1 Site Information**

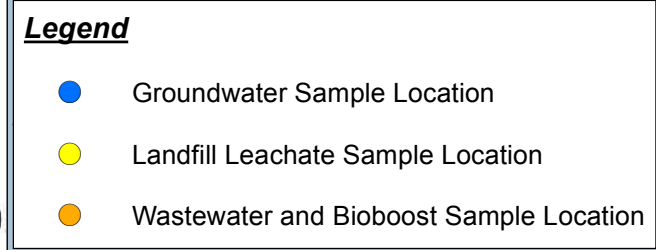
Site name	Sample IDs	Site address	Map reference (NZTM )
BTW Wellington Landfarm	GND2285	Brown Road, Waitara,	E1704632 / N5683531
Dawson House	GND2677	97 King Street, New Plymouth	E1672439 / N5676158
Ocean View Parade	GND2740	1 Bayly Road, Port Taranaki	E1690234 / N5675937
Carrington Road	GND0508	696 Carrington Road	E1694021 / N5669859
Broadway, Stratford	GND1723	127 Broadway, Stratford	E1710600 / N5645134
Colson Road Landfill	SW01	Colson Rd, Glen Avon	E1697026 / N5676256
Hawera Landfill	SW02	Matangara Rd, Hawera	E1711333 / N5617107
New Plymouth Wastewater Treatment Plant	WW01 (effluent), WW02 (influent), BB01 (bioboost)	Rifle Range Rd, Waiwhakaiho	E1697008 / N5678332

Notes:

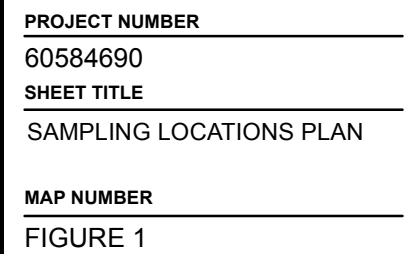
NZTM – New Zealand Transverse Mercator

The locations of the Sites are presented on **Figure 1**. Site cards which were provided by TRC and have further details on the site locations are included in **Appendix A**.





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## 3.0 Field Works

### 3.1 Laboratory Selection

TRC engaged AsureQuality Limited (AsureQuality) to complete PFAS analysis, at their Lower Hutt laboratory. AsureQuality is an ISO17025 accredited laboratory and was the only provider of PFAS analysis in New Zealand at the time the field works were undertaken. AsureQuality's PFAS methods comply with the Heads of Environmental Protection Authorities Australia and New Zealand (HEPA) PFAS National Environmental Management Plan, January 2018 (NEMP) and the United States Department of Defence (US DOD)/Department of Energy Quality Systems Manual for Environmental Laboratories.

### 3.2 Scope of Work

Sampling was undertaken on 6 and 7 August 2018, and included the following locations and media:

- Groundwater from the selected monitoring wells (BTW Wellington Landfarm, Dawson House, Ocean View Parade, Carrington Road, and Broadway, Stratford).
- Leachate from Colson Road and Hawera landfills.
- Wastewater influent and effluent, and bioboost from the New Plymouth Wastewater Treatment Plant (refer **Figure 1** for influent and effluent sampling locations).

The sampling comprised:

- Volatile organic compounds (VOC) concentrations in the headspace of each monitoring well were measured immediately after opening each well, and were measured at each leachate sampling location, using a photo-ionisation detector (PID).
- The total well depth, depth to groundwater, and the presence/absence of light non-aqueous phase liquid (LNAPL) were gauged using an electronic oil-water interface probe in each of the monitoring wells.
- Prior to sampling, groundwater was purged from the monitoring wells using the 'low flow' method to minimise turbidity. The wells were purged for up to 15 minutes at approximate rates of 0.1 L/m, until field screening of the extracted groundwater for pH, temperature, electrical conductivity, oxidation/reduction potential, dissolved oxygen, and turbidity indicated that these parameters had stabilised<sup>1,2</sup>. Between 1.5 L and 2.0 L of groundwater was purged from each well using dedicated high density polyethylene (HDPE) and silicone tubing. Groundwater samples were then collected by pumping groundwater from approximately 0.5 m below static water level into laboratory prepared bottles. The groundwater sampling field sheets are presented in **Appendix B**.
- Prior to sampling leachate and wastewater, subsurface water from each sampling location was used to rinse a laboratory supplied, unpreserved subsampling bottle three times. Samples were then collected from the subsurface into the subsampling container using a mighty gripper, and transferred to laboratory prepared sample bottles. The leachate and wastewater sampling field sheets are presented in **Appendix B**.
- A sample of the bioboost was collected by hand from a bucket containing composites of bioboost produced by the plant during the week prior to sampling.
- The bottles and jars were placed into chilled storage bins and sent to AsureQuality under AECOM chain of custody procedures, where they were analysed for PFAS. Due to potential for pathogens, wastewater samples were transported in a separate bin and underwent gamma irradiation prior to PFAS analysis. Chain of custody documentation is provided in **Appendix C**.

<sup>1</sup> pH did not stabilise after 10 minutes of purging monitoring well GND 2677 (Dawson House); a sample was subsequently collected as the remaining parameters had met stabilisation criteria.

<sup>2</sup> Stabilisation of turbidity could not be confirmed for monitoring wells GND 2285, GND2740, GND0508 and GND1723 (BTW Wellington Landfarm, Ocean View Parade, Carrington Road, and Broadway, Stratford, respectively) due to faulty connection between turbidity meter and cable.

- Appropriate isolation and decontamination procedures were undertaken during sampling as per AECOM PFAS sampling protocols, with special care taken to eliminate the potential for contamination of sampling equipment, materials, and water samples with PFAS. AECOM PFAS sampling protocols have been developed in accordance with US DOD<sup>3</sup>, United States Environmental Protection Agency (US EPA)<sup>4</sup> and United States Navy<sup>5</sup> guidance documents, and include the use of a two-person team for groundwater, leachate, and wastewater sampling (“clean hands, dirty hands”) in general accordance with US EPA Method 1669<sup>6</sup>, where “clean hands” handle only sample bottles during sampling and “dirty hands” handle equipment.
- To further reduce potential for cross-contamination, groundwater sampling was completed prior to leachate and wastewater sampling, as the leachate and wastewater were considered more likely to be impacted with PFAS.
- For quality assurance/quality control (QA/QC) purposes, the following samples were collected and analysed for PFAS:
  - Trip blanks were not provided by the laboratory and thus were not analysed.
  - Duplicate groundwater sample QAQC01, collected from monitoring well GND2470 (Ocean View Parade) during ‘low flow’ groundwater sampling.
  - Field blank sample QAQC02, collected by filling sample bottle with laboratory supplied Type 1 reagent water near monitoring well GND2740 (Ocean View Parade).
  - Equipment blank sample QAQC03, collected by pouring laboratory supplied Type 1 reagent water over the oil-water interface probe and into a laboratory supplied sample bottle, after decontaminating the probe upon completion of groundwater sampling.
  - Duplicate leachate sample QAQC04, collected from location SW01 (Colson Road landfill).
  - Field blank sample QAQC05, collected by filling sample bottle with laboratory supplied Type 1 reagent water near SW01 (Colson Road landfill).
  - Equipment blank sample QAQC06, collected by pouring laboratory supplied Type 1 reagent water over the sampling end of the Mighty Gripper and into a laboratory supplied sample bottle, after decontaminating the Mighty Gripper upon completion of leachate and wastewater grab sampling.
- Purge water and decontamination water was containerised and disposed of at the New Plymouth Wastewater Treatment plant at the completion of groundwater sampling.

## 4.0 Results

### 4.1 Groundwater Levels

Depth to groundwater measured during the August 2018 sampling event are presented in **Table 2**. Reduced groundwater levels are also presented for locations where top-of-casing (TOC) elevations were provided by TRC.

Standing water levels ranged from 0.713 metres below TOC(m bTOC) at GND2285 (BTW Wellington Landfarm) to 4.871 m bTOC at GND0508 (Carrington Road).

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<sup>3</sup> Department of Defence, United States (DoD), October 2016. Bottle Selection and Other Sampling Considerations When Sampling for Per- and Poly-Fluoroalkyl Substances (PFAS).

<sup>4</sup> US EPA, January 2010. USEPA Document EQASOP-GW 001, Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, Version 3.

<sup>5</sup> US Navy, September 2015. Field Sampling Protocols to Avoid Cross-contamination During Water Sampling for Perfluorinated Compounds (PFCs), Navy Guidance Document.

<sup>6</sup> Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels, United States Environmental Protection Agency, July 1996.



## 4.2 Field Observations

No foam or other visual evidence of PFAS presence was observed in groundwater during gauging, purging and sampling of any of the monitoring wells.

Headspace VOCs measured in the groundwater wells ranged from 1 part per million (ppm) to 2.7 ppm. A slight hydrocarbon odour was noted during gauging, purging and sampling of monitoring well GND1723 (Broadway, Stratford).

No foam or other visual evidence of PFAS presence was observed in leachate or wastewater during grab sampling. VOCs measured at the leachate sampling locations were 10 ppm (Colson Road Landfill) and 2.2 ppm (Hawera Landfill).

## 4.3 Analytical Results

### 4.3.1 Groundwater

The groundwater analytical results are presented in **Table 3**.

Perfluorooctanoic acid (PFOA) was detected in sample GND2285 (BTW Wellington Landfarm) at a concentration of 0.019 µg/L. PFAS were not detected above laboratory limits of reporting (LORs) in the other groundwater samples.

### 4.3.2 Landfill Leachate

The leachate analytical results are presented in **Table 3**. The following points are noted.

- Perfluorohexane sulfonic acid (PFHxS), perfluorooctane sulfonic acid (PFOS), and PFOA were detected in the leachate sample collected from Colson Road Landfill at concentrations of 0.15 µg/L, 0.077 µg/L, and 0.24 µg/L respectively.
- PFHxS, PFOS, and PFOA were detected in the leachate sample collected from Hawera Landfill at concentrations of 0.014 µg/L, 0.031 µg/L and 0.045 µg/L respectively.

### 4.3.3 New Plymouth Wastewater Treatment Plant

The wastewater analytical results are presented in **Table 3**. The following points are noted.

- PFHxS, PFOS, and PFOA were detected in the effluent wastewater sample at concentrations of 0.0023 µg/L, 0.001 µg/L and 0.004 µg/L respectively.
- PFAS were not detected in the influent wastewater sample above the higher laboratory LOR (0.1 µg/L) applied to this sample due its turbidity.

The bioboost analytical results are presented in **Table 4**. PFOS and PFOA were detected in the bioboost sample at concentrations of 0.0082 mg/kg and 0.0011 mg/kg respectively.

### 4.3.4 Quality Assurance / Quality Control

Samples were transported to AsureQuality, under AECOM chain of custody procedures, for analysis.

#### 4.3.4.1 Groundwater Samples

Groundwater samples were collected on 6 August 2018 and were received by AsureQuality on 8 August 2018.

PFAS were not detected above laboratory LORs in the duplicate groundwater sample collected from Ocean View Parade (QAQC01), or in the field blank (QAQC02) and equipment blank (QAQC03) samples collected during and immediately after the groundwater sampling, respectively.

AsureQuality indicated that the analysis for samples GND2285 (BTW Wellington Landfarm) and GND1723 (Broadway, Stratford) could not achieve a laboratory LOR below 0.1 µg/L owing to the high turbidity of the samples. In order to achieve a lower LOR of 0.01 µg/L for these samples, they were reanalysed using a deviation to the accredited methodology at the request of AECOM.

#### 4.3.4.2 Leachate, Wastewater, and Bioboost Samples

Leachate, wastewater, and bioboost samples were collected on 7 August 2018 and were received byASUREQuality on 8 August 2018.

PFAS were not detected above laboratory LORs in the field blank sample (QAQC05) collected during leachate sampling, or the equipment blank sample (QAQC06) collected immediately after the leachate and wastewater sampling.

The calculated relative percentage difference (RPD<sup>7</sup>) for detected PFAS concentrations reported for the primary and duplicate leachate samples collected from Colson Road Landfill are presented in **Table 5**. The RPD calculated for the primary and duplicate leachate samples ranged from 0% to 15% and were within acceptable limits (less than 20%).

While accreditation was not possible for all samples due to the specificity of matrix required for accreditation, the analytical methods were considered valid for the sample types. Overall, the QA/QC results are assessed to meet the data quality objectives for this investigation.

### 4.4 Comparison with Interim Guidelines

Groundwater, leachate, and wastewater samples have been compared against relevant interim guideline values recommended by the HEPA NEMP, comprising:

- Australian Department of Health 2017 health-based guidance values for drinking and recreation water, with the recreation value selected for offsite recreational users and the drinking water provided for reference only (groundwater is not used for drinking water at the Sites).
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000), with 95% species protection level for PFOS and PFOA selected as appropriate for the Sites and the most-conservative 99% species protection level for PFOS and PFOA provided for reference only. These values were selected for aquatic/benthic organisms.

The bioboost sample has been compared against relevant health and ecological guidance values recommended by the HEPA NEMP, sourced from:

- Human health screening values based on 20% of Food Standards Australia New Zealand (FSANZ) tolerable daily intake value for PFOS/PFHxS and PFOA and the National Environment Protection (Assessment of Site Contamination) Measure, Level-A assumptions (home-grown produce providing up to 10% of fruit and vegetable intake). These human health screening values were selected for potential residential users of bioboost.
- Human health screening values based on 20% of FSANZ tolerable daily intake value for PFOS/PFHxS and PFOA and the National Environment Protection (Assessment of Site Contamination) Measure, Health Investigation Level-C (public open space) assumptions. These human health screening values were selected for potential use of bioboost in open spaces such as parks and playing fields.
- Human health screening values based on 20% of Food Standards Australia New Zealand (FSANZ) tolerable daily intake value for PFOS/PFHxS and PFOA and the National Environment Protection (Assessment of Site Contamination) Measure, Health Investigation Level-D (Industrial/commercial) assumptions. These human health screening values were selected for onsite commercial workers.
- Interim ecological indirect exposure screening values based on 2017 Canadian Federal Environmental Quality Guidelines for Residential and Parkland (soil ingestion by a secondary consumer) and Commercial and Industrial – Coarse Soil (concentration in soil that is expected to protect against potential impacts on freshwater life from PFOS originating soil that may enter groundwater and subsequently discharge to a surface water body). These values were selected for ecological receptors.

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<sup>7</sup> RPD = (primary result – duplicate result) x 100 / mean result

The NEMP notes that a degree of conservatism has been included in the guidelines values which means that exceeding these values does not constitute a risk if other pathways are controlled. This inbuilt conservatism is necessary when deriving screening values to be protective of communities where multiple exposure pathways may be present.

Guideline values are presented in **Tables 3 and 4** for comparison purposes. The following points are noted:

- The concentrations of PFHxS and PFOS detected in leachate from Colson Road Landfill exceeded the interim drinking water guideline value for PFHxS/PFOS.
- PFHxS/PFOS were not detected above the laboratory LOR (0.1 µg/L) in the influent wastewater sample from the New Plymouth Wastewater Treatment Plant. The LOR is greater than the interim guideline value for drinking water (0.07 µg/L).
- The PFHxS/PFOS detected in the bioboost was close to the residential screening criteria; however, these criteria are intended to apply to soil whereas bioboost is applied as a fertiliser and would only be a small component of garden soil.

All other analytical results are below the applicable interim guideline values for PFAS.

## 5.0 Discussion

Based on this initial screening, PFAS are present in one groundwater sample (GND2677 – BTW Wellington Landfarm), landfill leachates, effluent wastewater, and bioboost. The sole exceedance of interim guideline values was for the landfill leachate from the Colson Road Landfill, where PFHxS and PFOS concentrations were above the interim drinking water guideline for PFHxS/PFOS. However, this is not considered to represent a risk to drinking water users as the receiving water is not used as a drinking water source. It is noted that, owing to the higher laboratory LOR applied to the influent wastewater sample from the New Plymouth Wastewater Treatment Plant, the PFHxS and/or PFOS LOR exceed the interim drinking water guideline for PFHxS/PFOS. However the PFHxS and PFOS concentrations in the effluent wastewater sample were below the interim drinking water guideline.

The detected PFAS concentrations in bioboost were below relevant interim soil guidelines. This indicates bioboost does not pose a significant risk to users or ecological receptors where bioboost is used.

Though PFAS were detected in groundwater, leachate, wastewater and bioboost, the concentrations in this initial screening indicate it is unlikely there is a significant risk to human health or ecological receptors.

## 6.0 Limitations

All information in this report is provided strictly in accordance with and subject to the following limitations and recommendations:

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# Tables

**Table 2: Groundwater Gauging Data**

Well ID	Location	Date	Total Well Depth (m bTOC)	TOC Elevation (m RL) <sup>#</sup>	SWL (m bTOC)	Depth to LNAPL (m BTOC)	Groundwater Elevation (m RL)
GND2285	BTW Wellington Landfarm	06-Aug-18	7.000	14.65	0.713	ND	13.94
GND2677	Dawson House	06-Aug-18	10.500	-	1.942	ND	-
GND2740	Ocean View Parade	06-Aug-18	3.552	-	1.228	ND	-
GND0508	Carrington Road	06-Aug-18	14.000	120	4.871	ND	115.13
GND1723	Broadway, Stratford	06-Aug-18	5.042	-	3.213	ND	-

**Notes:**

SWL = Standing water level (pre-purging)

RL = Reduced level

m = Metres

bTOC = Below top of casing

LNAPL = Light non-aqueous phase liquid

<sup>#</sup>m RL = information obtained from Taranaki Regional Council

ND = Not detected

- = no data or not applicable

Table 3 - Groundwater, Leachate, and Wastewater Analytical Results

	Guideline Values					Groundwater Sample Details and Analytical Results							
Receptor	Human		Ecological										
Source of Criteria	Australian DoH 2017		ANZECC		Sample Location	BTW Wellington Landfarm	Dawson House	Ocean View Parade		Carrington Road	Broadway, Stratford	Field Blank	Equipment Blank (IF Probe)
Guideline	Drinking Water	Recreational Water	99% species protection	95% species protection	AECOM Sample Number	GND2285*	GND2677	GND2740	QAQC01	GND0508	GND1723*	QAQC02	QAQC03
					Sample Medium	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Type 1 Water	Type 1 Water
					Laboratory Sample Reference	18-213312-1	18-213312-2	18-213312-3	18-213312-6	18-213312-4	18-213312-14	18-213312-7	18-213312-8
					Date Sampled	6-Aug-18	6-Aug-18	6-Aug-18	6-Aug-18	6-Aug-18	6-Aug-18	6-Aug-18	6-Aug-18
Perfluoroalkylsulfonic acids					Perfluoroalkylsulfonic acids								
di-PFHxS	-	-	-	-	di-PFHxS	< 0.010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.010	< 0.0010	< 0.0010
mono-PFHxS	-	-	-	-	mono-PFHxS	< 0.010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.010	< 0.0010	< 0.0010
L-PFHxS	-	-	-	-	L-PFHxS	< 0.010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.010	< 0.0010	< 0.0010
Total PFHxS <sup>1</sup>	-	-	-	-	Total PFHxS <sup>1</sup>	< 0.010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.010	< 0.0010	< 0.0010
di-PFOS	-	-	-	-	di-PFOS	< 0.010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.010	< 0.0010	< 0.0010
mono-PFOS	-	-	-	-	mono-PFOS	< 0.010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.010	< 0.0010	< 0.0010
L-PFOS	-	-	-	-	L-PFOS	< 0.010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.010	< 0.0010	< 0.0010
Total PFOS <sup>2</sup>	-	-	0.00023	<u>0.13</u>	Total PFOS <sup>2</sup>	< 0.010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.010	< 0.0010	< 0.0010
PFHxS/PFOS <sup>3</sup>	<b>0.07</b>	<i>0.7</i>	-	-	PFHxS/PFOS <sup>3</sup>	< 0.010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.010	< 0.0010	< 0.0010
Perfluoroalkylcarboxylic acids					Perfluoroalkylcarboxylic acids								
PFOA	<b>0.56</b>	5.6	19	<u>220</u>	PFOA	0.019	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.010	< 0.0010	< 0.0010

	Guideline Values					Leachate and Wastewater Sample Details and Analytical Results							
Receptor	Human		Ecological										
Source of Criteria	Australian DoH 2017		ANZECC		Sample Location	Colson Road Landfill		Hawera Landfill	Wastewater Treatment Plant (Effluent)	Wastewater Treatment Plant (Influent)	Field Blank	Equipment Blank (Mighty Gripper)	Cells left blank intentionally for formatting purposes.
Guideline	Drinking Water	Recreational Water	99% species protection	95% species protection	AECOM Sample Number	SW01*	QAQC04*	SW02*	WW01	WW02	QAQC05	QAQC06	
					Sample Medium	Leachate	Leachate	Leachate	Wastewater	Wastewater	Type 1 Water	Type 1 Water	
					Laboratory Sample Reference	18-213312-5	18-213312-9	18-213312-13	18-201031-1	18-201031-2	18-213312-10	18-213312-11	
					Date Sampled	7-Aug-18	7-Aug-18	7-Aug-18	7-Aug-18	7-Aug-18	7-Aug-18	7-Aug-18	
Perfluoroalkylsulfonic acids					Perfluoroalkylsulfonic acids								
di-PFHxS	-	-	-	-	di-PFHxS	< 0.010	< 0.010	< 0.010	< 0.0010	< 0.10	< 0.0010	< 0.0010	Cells left blank intentionally for formatting purposes.
mono-PFHxS	-	-	-	-	mono-PFHxS	0.0310	0.036	< 0.010	< 0.0010	< 0.10	< 0.0010	< 0.0010	
L-PFHxS	-	-	-	-	L-PFHxS	0.12	0.12	0.014	0.0023	< 0.10	< 0.0010	< 0.0010	
Total PFHxS <sup>1</sup>	-	-	-	-	Total PFHxS <sup>1</sup>	0.15	0.16	0.014	0.0023	< 0.10	< 0.0010	< 0.0010	
di-PFOS	-	-	-	-	di-PFOS	< 0.010	< 0.010	< 0.010	< 0.0010	< 0.10	< 0.0010	< 0.0010	
mono-PFOS	-	-	-	-	mono-PFOS	0.028	0.028	0.015	0.0010	< 0.10	< 0.0010	< 0.0010	
L-PFOS	-	-	-	-	L-PFOS	0.049	0.046	0.016	< 0.0010	< 0.10	< 0.0010	< 0.0010	
Total PFOS <sup>2</sup>	-	-	0.00023	<u>0.13</u>	Total PFOS <sup>2</sup>	0.077	0.074	0.031	0.0010	< 0.10	< 0.0010	< 0.0010	
PFHxS/PFOS <sup>3</sup>	<b>0.07</b>	<i>0.7</i>	-	-	PFHxS/PFOS <sup>3</sup>	<b>0.23</b>	<b>0.23</b>	0.045	0.0033	< 0.10	< 0.0010	< 0.0010	
Perfluoroalkylcarboxylic acids					Perfluoroalkylcarboxylic acids								
PFOA	<b>0.56</b>	5.6	19	<u>220</u>	PFOA	0.24	0.25	0.045	0.0040	< 0.10	< 0.0010	< 0.0010	

Notes:  
All results and criteria are expressed in units of µg/L.  
\* Any tests marked with this symbol are not accredited for specific matrices or analytes (AsureQuality)  
- no criteria

PFHxS = perfluorohexane sulfonic acid  
di-PFHxS = total perfluorodimethylbutane sulfonic acids  
mono-PFHxS = total perfluoromethylpentane sulfonic acids  
L-PFHxS = linear perfluorohexanesulfonic acid  
PFOS = perfluorooctane sulfonic acid  
di-PFOS = total perfluorodimethylhexane sulfonic acids  
mono-PFOS = total perfluoromethylheptane sulfonic acids  
L-PFOS = linear perfluorooctanesulfonic acid  
PFOA = perfluorooctanoic acid

- 1. Total PFHxS = The numerical sum of di-PFHxS, mono-PFHxS, and L-PFHxS
- 2. Total PFOS = The numerical sum of di-PFOS, mono-PFOS, and L-PFOS
- 3. PFHxS/PFOS = The numerical sum of Total PFHxS and Total PFOS

Sources of Guideline Values:  
Australian DoH 2017: Health Based Guidance Values for PFAS for Use in Site Investigations in Australia. *Australia Government Department of Health, 2017.*  
ANZECC: National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC,2000. Technical draft default guideline values for PFOS and PFOA.

**Bold** - exceeds Australian DoH drinking water criteria  
*Italics* - exceeds Australian DoH recreational water criteria  
Underlined - Exceeds ANZECC 95% freshwater species protection criteria

**Table 4 - Bioboost Sample Analytical Results**

	Guideline Values						
Receptor	Human			Ecological			Soil Sample Details and Analytical Results
Source of Criteria	FSANZ 2017 and NEPM 1999			2017 Canadian Federal Environmental Quality Guidelines - Ecological Indirect Exposure		Sample Location	Wastewater Treatment Plant Bioboost
Guideline	Residential with garden/accessible soil	Public Open Space	Industrial/Commercial	Residential	Industrial/Commercial	AECOM Sample Name <sup>1</sup>	BB01*
						Laboratory Sample Reference	18-201033-12
						Date Sampled	07-Aug-18
<b>Perfluoroalkylsulfonic acids</b>						<b>Perfluoroalkylsulfonic acids</b>	
di-PFHxS	-	-	-		-	di-PFHxS	< 0.0010
mono-PFHxS	-	-	-		-	mono-PFHxS	< 0.0010
L-PFHxS	-	-	-		-	L-PFHxS	< 0.0010
Total PFHxS <sup>1</sup>	-	-	-		-	Total PFHxS <sup>2</sup>	< 0.0010
di-PFOS	-	-	-		-	di-PFOS	< 0.0010
mono-PFOS	-	-	-		-	mono-PFOS	< 0.0010
L-PFOS	-	-	-		-	L-PFOS	0.0082
Total PFOS <sup>2</sup>	-	-	-	<u>0.01</u>	<u>0.140</u>	Total PFOS <sup>3</sup>	0.0082
PFHxS/PFOS <sup>3</sup>	<b>0.009</b>	<b>1</b>	<b>20</b>		-	PFHxS/PFOS <sup>4</sup>	0.0082
<b>Perfluoroalkylcarboxylic acids</b>						<b>Perfluoroalkylcarboxylic acids</b>	
PFOA	<b>0.1</b>	<b>10</b>	<b>50</b>		-	PFOA	0.0011

**Notes:**

All results and criteria are expressed in units of mg/kg.

\* Any tests marked with this symbol are not accredited for specific matrices or analytes (ASUREQuality)

- no criteria

PFHxS = perfluorohexane sulfonic acid

di-PFHxS = total perfluorodimethylbutane sulfonic acids

mono-PFHxS = total perfluoromethylpentane sulfonic acids

L-PFHxS = linear perfluorohexanesulfonic acid

PFOS = perfluorooctane sulfonic acid

di-PFOS = total perfluorodimethylhexane sulfonic acids

mono-PFOS = total perfluoromethylheptane sulfonic acids

L-PFOS = linear perfluorooctanesulfonic acid

PFOA = perfluorooctanoic acid

1. Total PFHxS = The numerical sum of di-PFHxS, mono-PFHxS, and L-PFHxS

2. Total PFOS = The numerical sum of di-PFOS, mono-PFOS, and L-PFOS

3. PFHxS/PFOS = The numerical sum of Total PFHxS and Total PFOS

Sources of Guideline Values:

Food Standards Australia New Zealand (FSANZ), 2017. 20% of total daily intake value for PFOS/PFHxS and PFOA

National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 1999. Revised 2013.

Health Investigation Level-A (home-grown produce providing up to 10% of fruit and vegetable intake) assumptions in Section 3 of Schedule B7.

Health Investigation Level-C (Open/public space) assumptions in Section 3 of Schedule B7.

Health Investigation Level-D (Industrial/commercial) assumptions in Section 3 of Schedule B7.

Canadian Federal Environmental Quality Guidelines, 2017. Commercial and Industrial – Coarse Soil, ecological indirect exposure. Environment and Climate Change Canada.

**Bold** - exceeds FSANZ 2017 and NEPM 1990 criteria

Underlined - exceeds Canadian Federal Environmental Quality Ecological Indirect Exposure Guidelines



**Table 5: Relative Percentage Difference**

Analyte	Primary Sample	Duplicate	RPD%
	SW01	QAQC04	
mono-PFHxS	0.031	0.036	15%
L-PFHxS	0.12	0.12	0%
Total PFHxS <sup>1</sup>	0.15	0.16	6%
mono-PFOS	0.028	0.028	0%
L-PFOS	0.049	0.046	6%
Total PFOS <sup>2</sup>	0.077	0.074	4%
PFHxS/PFOS <sup>3</sup>	0.23	0.23	0%
PFOA	0.24	0.25	4%

**Notes:**

All results are expressed in units of µg/L.

RPD calculated only for detected compounds.

RPD: relative percentage difference

PFHxS = perfluorohexane sulfonic acid

di-PFHxS = total perfluorodimethylbutane sulfonic acids

mono-PFHxS = total perfluoromethylpentane sulfonic acids

L-PFHxS = linear perfluorohexanesulfonic acid

PFOS = perfluorooctane sulfonic acid

di-PFOS = total perfluorodimethylhexane sulfonic acids

mono-PFOS = total perfluoromethylheptane sulfonic acids

L-PFOS = linear perfluorooctanesulfonic acid

PFOA = perfluorooctanoic acid

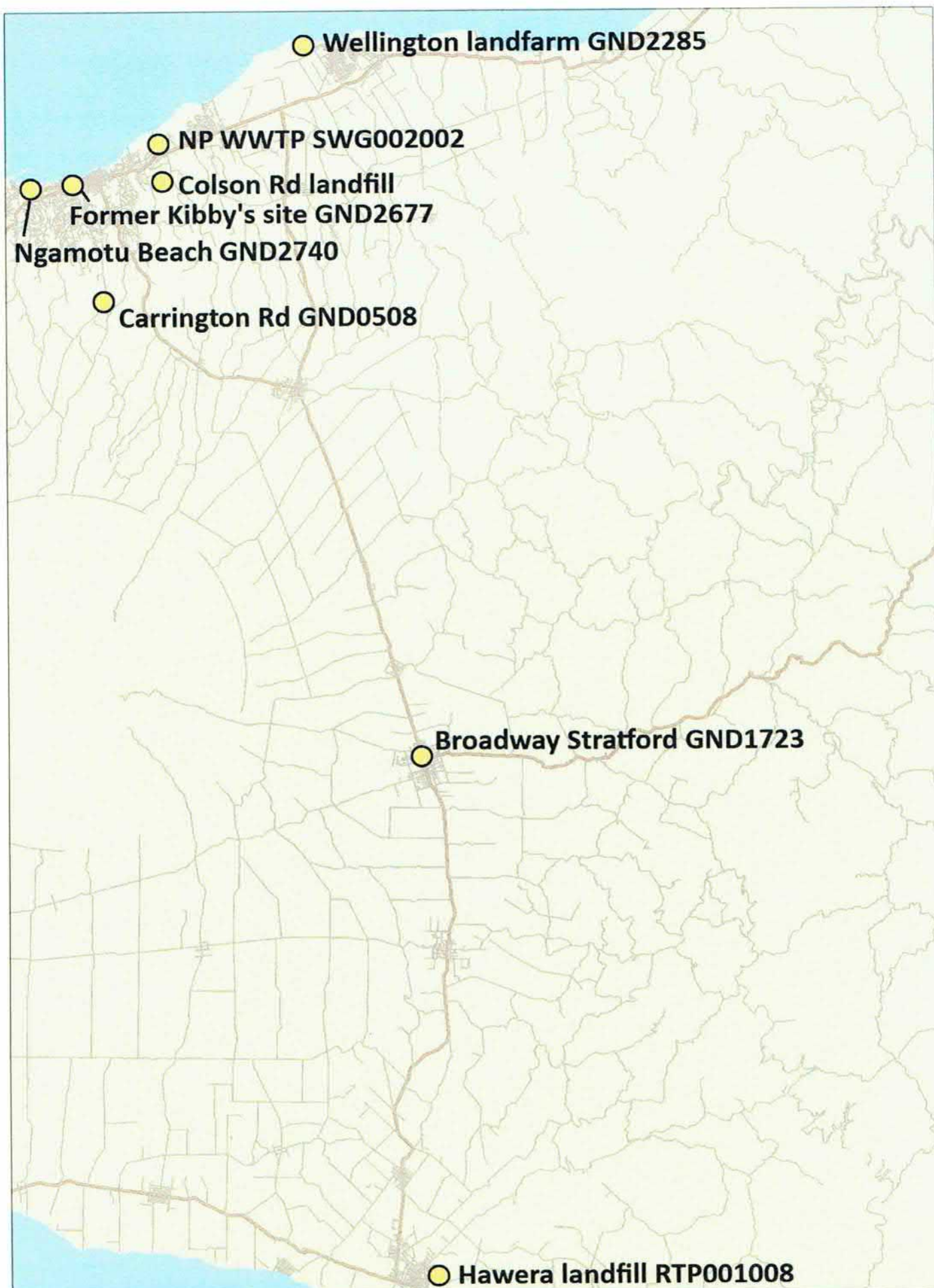
1. Total PFHxS = The numerical sum of di-PFHxS, mono-PFHxS, and L-PFHxS

2. Total PFOS = The numerical sum of di-PFOS, mono-PFOS, and L-PFOS

3. PFHxS/PFOS = The numerical sum of Total PFHxS and Total PFOS

# Appendix A

## Annotated Site Cards



[Site Details](#) » Groundwater Well DataSite **GND2285 -- Wellington Landfarm MW4**Location **BTW Wellington Landfarm Site, Brown Road, Waitara.**

Depth (m) 7

Diameter (m) 50

Drill Date 18 Aug 2012

Elevation (m) 14.65 (accuracy: GPS at well rim)

Construction Cased &amp; perforated

Pump Type No pump on this well

Bore Use Monitoring

Water Quality Data Location

Pump Test Data Location

Top of screen (m) 3.5

Bottom of screen (m) 6.5

Casing 1 (m)

Casing 2 (m)

High Static Water Level (m) 1.5

Low Static Water Level (m) 1.9



Site Code **GND2285**

Description **Wellington Landfarm MW4**

Location BTW Wellington Landfarm Site, Brown Road,  
Waitara.

NZTM Easting / Northing 1704632 / 5683531

Site Access Access from Brown Rd., MW4 is western most  
monitoring well in row of 3 north of the pit  
storage area.

Uses

Altitude 14.65 m

Dist. from coast Not recorded

Bio Category

Bio Habitat

Last updated 4 Apr 2013 by David Olson





Site Code **SWG002002**

Description **NEW PLYMOUTH DISTRICT COUNCIL**

Location **N.P.Carrousel Waste Trt.Plant**

NZTM Easting / Northing **1696211 / 5679248**

Site Access **Carrousel Wastewater Treatment Plant**

Comment **Grab sample from chloronation pool. 24 hour composite samples collected from line dropped to outlet (image 3)**

Uses **Consent Monitoring**

Dist. from coast **Not recorded**

Bio Category

Bio Habitat

Last updated **1 Nov 2007 by Peter Nolly**



24 hour composite sample location (1 Jan 1995)



Red cross marks location of outfall (1 Jan 1995)



Grab sample taken from site indicated  
by red cross in chlorination pool (1 Jan  
1995)











[Site Details](#) » Groundwater Well DataSite **GND2677 -- Dawson House Monitoring Well**Location **Dawson St Development Monitoring Bore, 97 King St**Depth (m) **10.5**Diameter (m) **50**Drill Date **23 Sep 2017**

Elevation (m) (accuracy: )

Construction **Drilled - screened**Pump Type **No pump on this well**Bore Use **Monitoring Bore (piezometer)**

Water Quality Data Location

Pump Test Data Location

Top of screen (m) **1.5**Bottom of screen (m) **10.5**

Casing 1 (m)

Casing 2 (m)

High Static Water Level (m) **1.8**

Low Static Water Level (m)

**Strata Data**

Depth (m)	Type	Static Water Level	Comment
1	Soil		light brwn silty subsoil
2	Silt		darkish brwn sandy silt
3	No lithological data available		Drk brwn silty ash
5	Clay		darkish brwn silty clay
6	Boulder		rock boulder layer
7	Rock		Hardrock solid boulder layer
8	Sand		silty sand with loose rocks
9	Gravel		Sandy with loose rocks
10	Boulder		Hard boulder layer
12	Gravel		Med/Hard sandy gravels
12.5	Gravel C		Coarse/sandy gravels



Site Code **GND2677**

Description **Dawson House Monitoring Well**

Location Dawson St Development Monitoring Bore, 97 King St

NZTM Easting / Northing 1692439 / 5676158

Comment Refer to bore log #1981263 for more information  
Drilled by strata drilling 0.5 slotted PVC for screen

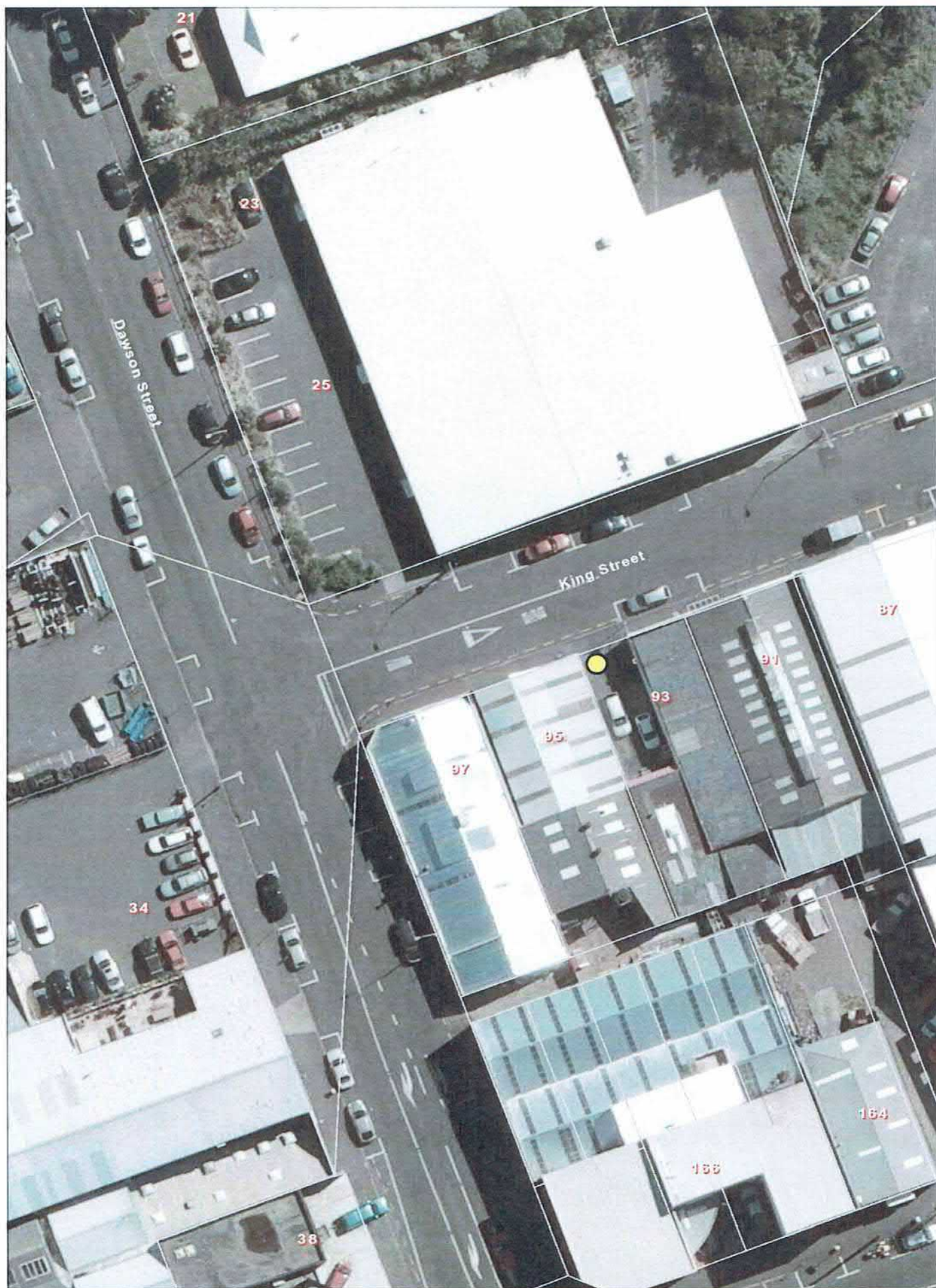
Uses

Dist. from coast Not recorded

Bio Category

Bio Habitat

Last updated 22 Jan 2018 by campbell



[Site Details](#) » Groundwater Well DataSite **GND2740 -- Bayly Road Historic Oilfield DSI MW2**Location **Bayly Road, Down gradient fo Wetland**Depth (m) **4**Diameter (m) **0.2**Drill Date **2 Jul 2015**

Elevation (m) (accuracy: )

Construction **Driven pipe - screened**Pump Type **No pump on this well**Bore Use **Monitoring Bore (piezometer)**

Water Quality Data Location

Pump Test Data Location

Top of screen (m) **1**Bottom of screen (m) **3.9**

Casing 1 (m)

Casing 2 (m)

High Static Water Level (m) **1.3**

Low Static Water Level (m)

**Strata Data**

Depth (m)	Type	Static Water Level	Comment
0.2	Clay		Fill. Silty clay, dark brown, moist-wet, soft, plastic.
0.9	Sand		Fill. Silty fine sand w/ some gravel; orange/brown dry tight
3.4	Sand C		Fine sand, black speckled grey. dry-moist, loosely packed
3.6	Sand		Gravelly fine sand, black. saturated, tightly packed
3.7	Clay		Silty clay w/ some sand. grey/ green streaked orange, satura
4	Sand		Gravelly fine sand, black. as above

Site Code **GND2740**

Description **Bayly Road Historic Oilfield DSI MW2**

Location Bayly Road, Down gradient fo Wetland

NZTM Easting / Northing 1690234.35 / 5675937.06

Uses

Dist. from coast Not recorded

Bio Category

Bio Habitat

Last updated 3 Aug 2017 by Rachel McDonnell







[Site Details](#) » Groundwater Well DataSite **GND0508 -- GROUNDWATER SEM**Location **Carrington Road**Depth (m) **14**Diameter (m) **0.1**Drill Date **29 May 2003**Elevation (m) **120 (accuracy: GPS at well rim)**Construction **Drilled - screened**Pump Type **No pump on this well**Bore Use **Monitoring Bore (piezometer)**

Water Quality Data Location

Pump Test Data Location

Top of screen (m) **8**Bottom of screen (m) **14**

Casing 1 (m)

Casing 2 (m)

High Static Water Level (m) **3.3**Low Static Water Level (m) **9.3****Aquifer Data**

Start Depth (m)	End Depth (m)	Name	Type
0		Volcanics	Unknown

**Strata Data**

Depth (m)	Type	Static Water Level	Comment
2	No lithological data available		d. brown loamy soil
3	Ash		d. brown weathered ash
4.8	Mixed		d. brown crystalline ash & 1cm volc lith
5	Ash		Hard lense ignimbrite (welded ash)
7	Sand		soft sandy ash with volc lithics
7.5	No lithological data available		Ignimbrite
14	Ash		Soft sandy crystalline ash

Site Code **GND0508**

Description **GROUNDWATER SEM**

Location Carrington Road

NZTM Easting / Northing 1694021 / 5669859

River Number 391000

River Te Henui

Site Access Well on the road shoulder, across from 696 Carrington Rd

Comment SEM level & quality (NGMP) site. Isotope. Pesticide. About 1m from fence & 1m from south end. Bore workover completed on May-03 by Interdrill - Hole cleaned & deepened from 8.6 to 14.0m. Screen depth not updated in database following workover. Assumed to now be located from 8 m to 14 m.  
**WARNING: SEE NGC BEFORE DOING ANY MAINTENANCE ON THIS WELL** Drilled by Hopkins; W-Clyde rpt Monitoring pipeline, location not accurate. Sampled for NGMP and GW Nitrates programmes. Sampled using bladder pump. Car access for pump power. Headworks flush with ground, metal cover requires screwdriver or manhole lifter to access. Level logger installed in this well. No other tools required.

**Hazards** Roadside sampling site close to traffic in 100km area.  
**Wear Hi Vis**

Uses Investigation, State Environment Monitoring

Altitude 120 m

Dist. from coast 6.72 km

Bio Category

Bio Habitat

Last updated 18 May 2018 by Regan Phipps



GND0508

Headworks GND0508 (left), Sampling GND0508 with car access showing site location (right) (26 Sep 2016)





Site access map, can turn car in turning circle across road (26 Sep 2016)

[Site Details](#) » Groundwater Well DataSite **GND1723 -- GROUNDWATER**Location **Standard Timber, 127 Broadway, Stratford**

Depth (m)

Diameter (m)

Drill Date

Elevation (m) (accuracy: Unknown)

Construction **Drilled - screened**Pump Type **No pump on this well**Bore Use **Monitoring Bore (piezometer)**

Water Quality Data Location

Pump Test Data Location

Top of screen (m)

Bottom of screen (m)

Casing 1 (m)

Casing 2 (m)

High Static Water Level (m) **3.5**

Low Static Water Level (m)

**Aquifer Data**

Start Depth (m)	End Depth (m)	Name	Type
0		Volcanics	Unknown

Site Code **GND1723**

Description **GROUNDWATER**

Location Standard Timber, 127 Broadway, Stratford

NZTM Easting / Northing 1710600 / 5645134

Site Access Toby cap on roadside verge outside premises

Uses Investigation

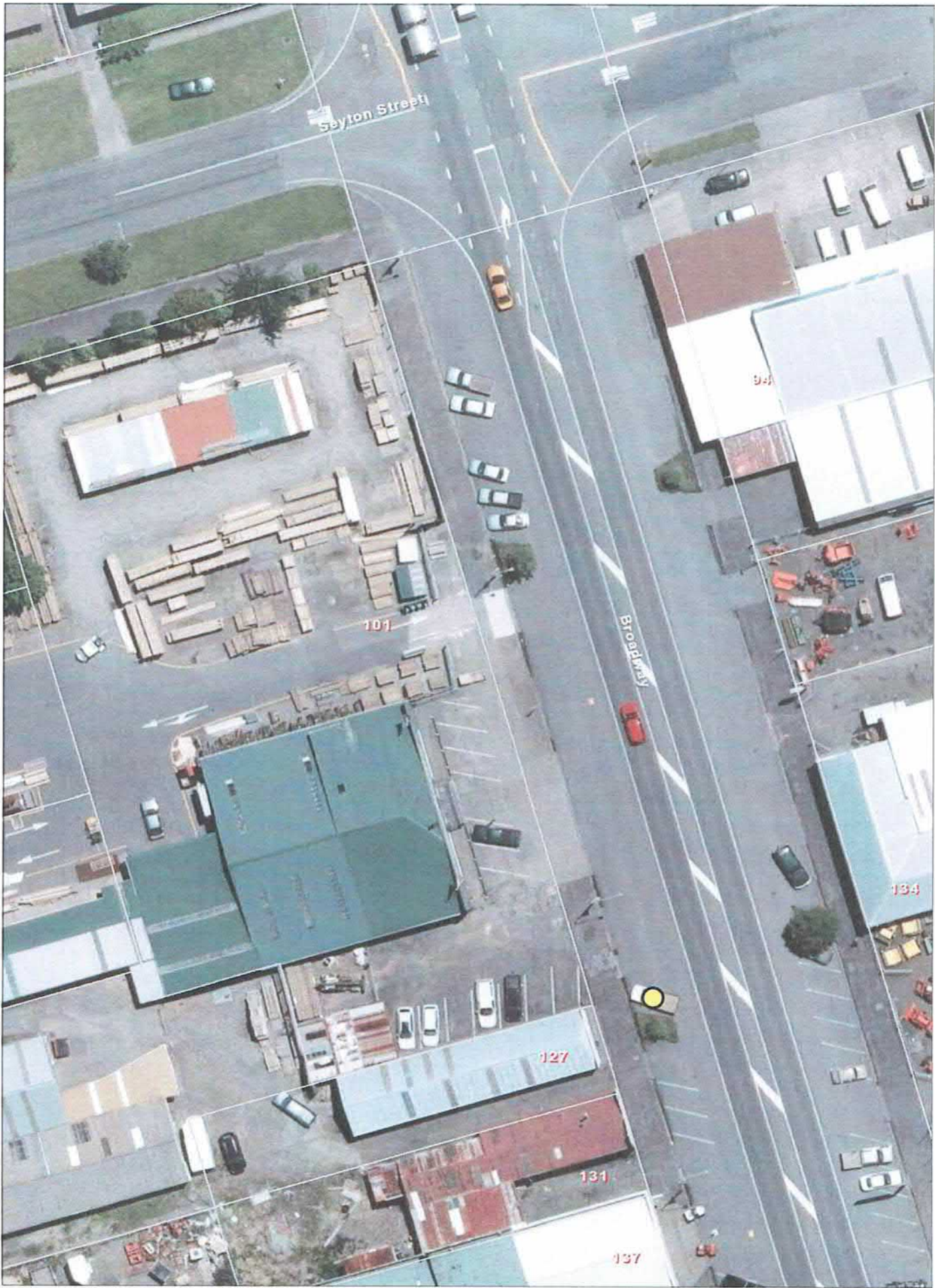
Dist. from coast Not recorded

Bio Category

Bio Habitat

Last updated 1 Nov 2007 by Peter Nolly







Site Code **RTP001008**

Description **SOUTH TARANAKI DISTRICT COUNCIL**

Location **Hawera Landfill leachate from sump.**

NZTM Easting / Northing **1711333 / 5617107**

River Number **348010**

River **Tawhiti 1 (Tangahoe)**

Site Access **Via dairy track off 2a Ropata St.**

Comment **Discharge to sewer. Lift grille over top of leachate sump and sample - use a pole. Wear gloves.**

Uses **Consent Monitoring**

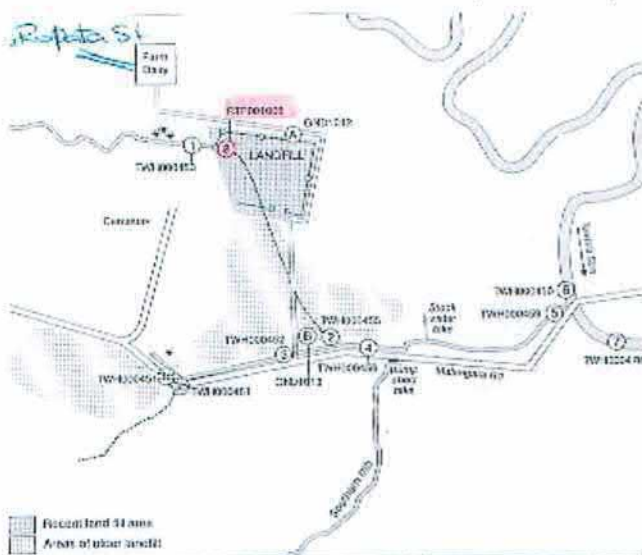
Altitude **80 m**

Dist. from coast **Not recorded**

Bio Category

Bio Habitat

Last updated **1 Nov 2007 by Peter Nolly**



Location diagram (No date)



Old sewage leachate structure (5 Dec 2014)







# Appendix B

## Field Sampling Sheets



Q4AN(EV)-414-FM1

Confirm NAPL and groundwater levels by repeat measurements. All columns must be completed. If NAPL is not present in a well write 'ND' (Not Detected) in the relevant column.

~~NO~~  
STAINING  
KABIR  
NEED TUBING  
NO COLOUR  
OR TURB.

(PID) - photo ionisation detector; (ppm) - parts per million; (LNAPL) - light non-aqueous phase liquids; (DNAPL) - dense light non-aqueous phase liquid; (mBTC) - metres below top of casing

FQM-5 14-F1  
FQM - NAPL and Groundwater Level Gauging Record (Q4AN(EV)-414-FM1)  
Revision 1 May 2, 2016

Q4AN(EV)-405-FM1  
FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)  
Revision 2 July 12, 2016



## FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

GND 3508

Project Name: <u>TRC PFAJ</u>		Project Number: <u>60584690</u>		PM Name: <u>SEAN HUGHES</u>		Bore ID: <u>GND 0508</u>			
Client: <u>TRC</u>		Project Location: <u>CARRINGTON RD</u>		Fieldwork Staff: <u>RI + AS/TC</u>		Sample Date: <u>6/8/18</u>			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level: <u>4-871</u>	Bore Radius (mm):	Chem Kit Serial No.:	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate: <u>100ml/min</u>		Hydrasleeve Size:			
Depth to GW (m-pvc): <u>5</u>	Screen Interval (m):	Chem Kit Model:	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): <u>14.0</u>	Casing Radius (mm): <u>50</u>	Corrected Redox: <u>Y / N</u>	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):			
Depth to Product (m-pvc): <u>-</u>	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:			
Product Thickness (m): <u>-</u>	Bore Locked (YES/NO): <u>NO</u>	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time:			
Key Type (if applicable): <u>N/A</u>						Parameters			
Calculated bore volume (L): <u>-</u>		Includes/ excludes bore annulus (circle) <u>-</u>		# purge volumes removed: <u>-</u>		Total purged volume (L): <u>2.06</u>			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
11:35	0.5	4-871	100ml/min	6.61	121.3	5.81	1.70	17.0	Turb 1.4 NTU NVO
11:40	1.0	5-104	↓	5.62	119.2	5.75	11.0	17.0	" 7.3 "
11:45	1.5		↓	5.60	118.0	5.74	18.9	17.2	" 2.4 "
11:50	2.0	5-151	↓	5.77	116.1	5.72	24.8	17.7	" 10.3 "
NOTE: turbidity meter connection problem depending on position of cord - changing results.									
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO <sub>3</sub> )			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H <sub>2</sub> SO <sub>4</sub> )	x 100 mL Amber	x 250 mL Plastic			2.5 ppm - ambient 2.2 ppm Temp ↑ due to flow cell being in direct sunlight. Well also dedicated bore for water level logging - constant wire positioned within well - regularly monitored & decontaminated w bleach solution.		
Approval and Distribution									
Fieldwork Staff Signature		<u>6/8/18</u>	Checker Name and Signature		<u>14/11/18</u>				
Project Manager Signature		<u>14/11/18</u>	Distribution: Project Central File						

## Q4AN(EV)-405-FM1

Q4AN(EV)-405-FM1  
FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)  
Revision 2 July 12, 2016



## FQM - Groundwater Sampling and Purging Record

Project Name: <u>TRC PFAS</u>		Project Number: <u>60584690 / 1-2</u>		PM Name: <u>SEAN HODGENS</u>		Bore ID: <u>6ND 2285</u>			
Client: <u>TRC</u>		Project Location: <u>BTW - WAITARA</u>		Fieldwork Staff: <u>RJ + AS (TRC)</u>		Sample Date: <u>6/8/18</u>			
General Bore Information				Decontamination		Well Development or Well Sampling Event? (circle)			
Date of GW Level: <u>6/8/18</u>	Bore Radius (mm): <u>200</u>	Chem Kit Serial No.:	<input type="checkbox"/> Decontaminated	Sampling Method		Hydrasleeve info.			
Depth to GW (m-pvc): <u>0.713</u>	Screen Interval (m): <u>-</u>	Chem Kit Model:	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Bore Depth (m-pvc): <u>~7m</u>	Casing Radius (mm): <u>50</u>	Corrected Redox: <u>Y / N</u>	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Hydrasleeve Type:	Gauging		
Depth to Product (m-pvc): <u>-</u>	Cover Type (gatic/stick up): <u>-</u>	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Sampling Depth (m-pvc):	Hydrasleeve Install time:		
Product Thickness (m): <u>-</u>	Bore Locked (YES/NO): <u>YES</u>	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out		
Key Type (if applicable): <u>TRI</u>						Parameters:			
Calculated bore volume (L): <u>1.5</u>		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L): <u>1.5</u>			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or $\mu$ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
14:25	0.0	0.713	100 ml/m	25.2	4076	6.08	24.4	16.8	TURBIDITY $\rightarrow$ 4.7 NTU
14:30	0.5	0.736	$\downarrow$	18.7	4079	6.10	-12.9	16.5	10.2
14:35	1.0	$\downarrow$	$\downarrow$	18.5	4081	6.08	-18.9	16.3	30.5
14:40	1.5	$\downarrow$	$\downarrow$	18.7	4077	6.07	-21.8	16.3	44.6
Acceptable Parameter Range: $\pm 10\%$ $\pm 3\%$ $\pm 0.05$ $\pm 10$ mV $\pm 0.2$ °C $\pm 10\%$ turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO <sub>3</sub> )			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H <sub>2</sub> SO <sub>4</sub> )	x 100 mL Amber	x 250 mL Plastic			NOTE $\rightarrow$ TURBIDITY METER CONSTANTLY PLAYING UP - SEEMED LIKE FAULT IN CONNECTION AS VALUES CHANGED WITH POSITION OF CORD.		
Approval and Distribution									
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>6/8/18</u>		Checker Name and Signature: <u>Vicky W</u>		Date: <u>14/11/18</u>		EVIDENCE OF <del>HYDRA</del> OXIDISED IRON ON OUTER SURFACE	
Project Manager Signature: <u>[Signature]</u>		Date: <u>14/11/18</u>		Distribution: Project Central File				PID $\rightarrow$ 1.3ppm ambient $\rightarrow$ 1.8ppm.	



## FQM - Groundwater Sampling and Purging Record

Project Name: <u>TRC PFAS</u>		Project Number: <u>60584690</u>		PM Name: <u>SEAN HUDGENS</u>		Bore ID: <u>LAND 1723</u>			
Client: <u>TRC</u>		Project Location: <u>STRATFORD</u>		Fieldwork Staff: <u>RJ + AS (TRC)</u>		Sample Date: <u>6/8/18</u>			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: <u>6/8/18</u>	Bore Radius (mm): <u>150</u>	Chem Kit Serial No.:	<input type="checkbox"/> Decontaminated	Sampling Method		Hydrasleeve info.			
Depth to GW (m-pvc): <u>3.213</u>	Screen Interval (m): <u>—</u>	Chem Kit Model:	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Bore Depth (m-pvc): <u>3.042</u>	Casing Radius (mm): <u>50</u>	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Hydrasleeve Type:			
Depth to Product (m-pvc): <u>—</u>	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Sampling Depth (m-pvc):	Gauging		
Product Thickness (m): <u>—</u>	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:	Hydrasleeve in		
	Key Type (if applicable): <u>TRI</u>					Sampling Start Time:	Hydrasleeve out		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or $\mu$ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
16.00	0.5	3.262	100ml/m	2.46	198.7	6.20	-39.4	15.9	TURB 17.2 NTU
16.05	1.0	3.282	↓	1.40	198.7	6.19	-39.0	15.9	12.3
16.10	1.5	↓	↓	1.27	201.0	6.19	-39.7	15.8	8.6
16.15	2.0	↓	↓	1.19	202.4	6.20	-36.2	15.8	7.0
									- hydrocarbon odour in purge water + hydrocarbon odour noted on alcathe tubing (at bore) that was in well
									- inconsistent turb. readings based on cord positioning.
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO <sub>3</sub> )			Bore volume calculation, bore condition, fate of tubing, redox correction etc.  ambient PID = 3.0ppm downhole = 2.7ppm existing water tubing downhole had to remove to get tubing (ADPE) down. - purged water had HCL odour. - ambient PID readings high due to proximity to car exhausts along SH1		
		2 x 40 mL Vial (H <sub>2</sub> SO <sub>4</sub> )	x 100 mL Amber	x 250 mL Plastic					
		1 x TPA 250							
Approval and Distribution									
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>6/8/18</u>	Checker Name and Signature: <u>[Signature]</u>		Date: <u>14/11/18</u>				
Project Manager Signature: <u>[Signature]</u>		Date: <u>14/11/18</u>	Distribution: Project Central File						

[illegible]

$$LEI = \frac{20.9}{2} = 10.45$$



2:15 pm.

[illegible]

Q4AN(EV)-405-FM1  
FGM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)  
Revision 2 July 12, 2016

Q4AN(EV)-405-FM1  
 FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)  
 Revision 2 July 12, 2016



INFLUENT

Q4AN(EV)-405-FM1  
FQM - Groundwater Sampling and Purging Record (Q4AN(EV)-405-FM1)  
Revision 2 July 12, 2016

# Appendix C

## Laboratory Analytical Reports



# Certificate of Analysis

**Submission Reference: TRC-PFAS-2018**

**Final Report**

**Sean Hudgens**  
**AECOM Consulting Services - Wellington**  
**PO Box 27277**  
**Wellington 6141**  
**New Zealand**

PO Number: 73494

Report Issued: 02-Oct-2018

AsureQuality Reference: **18-213312b**

Sample(s) Received: 08-Aug-2018 08:15

## Comments

The results for AsureQuality Reference 18-213312b were previously reported under AsureQuality Reference 18-201033 & 18-213312 in report numbers 1211355 & 1220922. The reproduction report has been issued at the customer's request.

## Results

The tests were performed on the samples as received.

**Customer Sample Name:** GND2285

**AsureQuality ID:** 18-213312-1

**Sample Condition:** Acceptable

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPrS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFBS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA *	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFOA *	0.019	µg/L	AsureQuality Method (LC-MS/MS)
PFNA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality has used reasonable skill, care, and effort to provide an accurate analysis of the sample(s) which form(s) the subject of this report. However, the accuracy of this analysis is reliant on, and subject to, the sample(s) provided by you and your responsibility as to transportation of the sample(s). AsureQuality's standard terms of business apply to the analysis set out in this report.

**Report Number:** 1256812

This report must not be reproduced except in full, without the prior written approval of the laboratory.

**Page 1 of 36**

Test	Result	Unit	Method Reference
PFUnDA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS *	97	%	AsureQuality Method (LC-MS/MS)
M3PFHxS *	108	%	AsureQuality Method (LC-MS/MS)
M8PFOS *	108	%	AsureQuality Method (LC-MS/MS)
M4PFBA *	NR	%	AsureQuality Method (LC-MS/MS)
M5PFPeA *	73	%	AsureQuality Method (LC-MS/MS)
M5PFHxA *	109	%	AsureQuality Method (LC-MS/MS)
MPFHpA *	113	%	AsureQuality Method (LC-MS/MS)
M8PFOA *	108	%	AsureQuality Method (LC-MS/MS)
M9PFNA *	114	%	AsureQuality Method (LC-MS/MS)
M6PFDA *	118	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA *	110	%	AsureQuality Method (LC-MS/MS)
MPFDoDA *	104	%	AsureQuality Method (LC-MS/MS)
MPFTeDA *	87	%	AsureQuality Method (LC-MS/MS)
MPFOSA *	108	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA *	103	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA *	105	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA *	99	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA *	106	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE *	107	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE *	109	%	AsureQuality Method (LC-MS/MS)
M4:2FTS *	116	%	AsureQuality Method (LC-MS/MS)
M6:2FTS *	123	%	AsureQuality Method (LC-MS/MS)
M8:2FTS *	122	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: GND2677

AsureQuality ID: 18-213312-2

Sample Condition: Acceptable

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPrS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDODA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	0.0087	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS	86	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	96	%	AsureQuality Method (LC-MS/MS)
M8PFOS	124	%	AsureQuality Method (LC-MS/MS)
M4PFBA	61	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	87	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	86	%	AsureQuality Method (LC-MS/MS)
MPFHpA	87	%	AsureQuality Method (LC-MS/MS)
M8PFOA	85	%	AsureQuality Method (LC-MS/MS)
M9PFNA	98	%	AsureQuality Method (LC-MS/MS)



Test	Result	Unit	Method Reference
M6PFDA	116	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	156 (R)	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	NR	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	100	%	AsureQuality Method (LC-MS/MS)
MPFOSA	133	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	146	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	134	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	186 (R)	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	166 (R)	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	104	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	70	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	99	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

Customer Sample Name: GND2740

AsureQuality ID: 18-213312-3

Sample Condition: Acceptable

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPoS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFDODA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS	103	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	114	%	AsureQuality Method (LC-MS/MS)
M8PFOS	150	%	AsureQuality Method (LC-MS/MS)
M4PFBA	85	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	99	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	101	%	AsureQuality Method (LC-MS/MS)
MPFHpA	106	%	AsureQuality Method (LC-MS/MS)
M8PFOA	104	%	AsureQuality Method (LC-MS/MS)
M9PFNA	117	%	AsureQuality Method (LC-MS/MS)
M6PFDA	144	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	NR	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	NR	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	107	%	AsureQuality Method (LC-MS/MS)
MPFOSA	142	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	156 (R)	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	153 (R)	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	130	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	120	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	126	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	87	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	126	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

Customer Sample Name: GND0508

AsureQuality ID: 18-213312-4

Sample Condition: Acceptable

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPoS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	0.0013	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS	93	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	100	%	AsureQuality Method (LC-MS/MS)
M8PFOS	127	%	AsureQuality Method (LC-MS/MS)
M4PFBA	64	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	94	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	92	%	AsureQuality Method (LC-MS/MS)
MPFHpA	94	%	AsureQuality Method (LC-MS/MS)
M8PFOA	89	%	AsureQuality Method (LC-MS/MS)
M9PFNA	103	%	AsureQuality Method (LC-MS/MS)
M6PFDA	130	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	155 (R)	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	NR	%	AsureQuality Method (LC-MS/MS)



Test	Result	Unit	Method Reference
MPFTeDA	128	%	AsureQuality Method (LC-MS/MS)
MPFOSA	138	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	135	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	130	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	174 (R)	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	161 (R)	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	100	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	70	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	105	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

Customer Sample Name: SW01

AsureQuality ID: 18-213312-5

Sample Description: Leachate water - landfill

Sample Condition: Acceptable

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPrS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFBS *	0.37	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1) *	0.031	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1) *	0.12	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3) *	0.15	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5) *	0.028	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5) *	0.049	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7) *	0.077	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1) *	0.23	µg/L	AsureQuality Method (LC-MS/MS)
PFNS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA *	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA *	0.41	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA *	0.080	µg/L	AsureQuality Method (LC-MS/MS)
PFOA *	0.24	µg/L	AsureQuality Method (LC-MS/MS)
PFNA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDODA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTTeDA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
NMeFOSA-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS *	96	%	AsureQuality Method (LC-MS/MS)
M3PFHxS *	112	%	AsureQuality Method (LC-MS/MS)
M8PFOS *	113	%	AsureQuality Method (LC-MS/MS)
M4PFBA *	NR	%	AsureQuality Method (LC-MS/MS)
M5PFPeA *	76	%	AsureQuality Method (LC-MS/MS)
M5PFHxA *	104	%	AsureQuality Method (LC-MS/MS)
MPFHpA *	116	%	AsureQuality Method (LC-MS/MS)
M8PFOA *	116	%	AsureQuality Method (LC-MS/MS)
M9PFNA *	111	%	AsureQuality Method (LC-MS/MS)
M6PFDA *	112	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA *	108	%	AsureQuality Method (LC-MS/MS)
MPFDODA *	108	%	AsureQuality Method (LC-MS/MS)
MPFTeDA *	106	%	AsureQuality Method (LC-MS/MS)
MPFOSA *	112	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA *	114	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA *	109	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA *	109	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA *	120	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE *	113	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE *	113	%	AsureQuality Method (LC-MS/MS)
M4:2FTS *	151 (R)	%	AsureQuality Method (LC-MS/MS)
M6:2FTS *	214 (R)	%	AsureQuality Method (LC-MS/MS)
M8:2FTS *	123	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

Customer Sample Name: QAQC01

AsureQuality ID: 18-213312-6

Sample Condition: Acceptable

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPrS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS	95	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	107	%	AsureQuality Method (LC-MS/MS)
M8PFOS	137	%	AsureQuality Method (LC-MS/MS)
M4PFBA	79	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	96	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	95	%	AsureQuality Method (LC-MS/MS)
MPFHpA	95	%	AsureQuality Method (LC-MS/MS)
M8PFOA	95	%	AsureQuality Method (LC-MS/MS)
M9PFNA	107	%	AsureQuality Method (LC-MS/MS)
M6PFDA	130	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	157 (R)	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	NR	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	122	%	AsureQuality Method (LC-MS/MS)
MPFOSA	120	%	AsureQuality Method (LC-MS/MS)



Test	Result	Unit	Method Reference
DNEtFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	148	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	155 (R)	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	138	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	132	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	121	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	80	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	113	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

Customer Sample Name: QAQC02

AsureQuality ID: 18-213312-7

Sample Condition: Acceptable

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPoS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPoS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS	99	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	103	%	AsureQuality Method (LC-MS/MS)
M8PFOS	116	%	AsureQuality Method (LC-MS/MS)
M4PFBA	101	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	97	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	96	%	AsureQuality Method (LC-MS/MS)
MPFHpA	98	%	AsureQuality Method (LC-MS/MS)
M8PFOA	93	%	AsureQuality Method (LC-MS/MS)
M9PFNA	103	%	AsureQuality Method (LC-MS/MS)
M6PFDA	114	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	113	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	110	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	59	%	AsureQuality Method (LC-MS/MS)
MPFOSA	133	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	109	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	119	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	141	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	135	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	101	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	77	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	101	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: QAQC03

AsureQuality ID: 18-213312-8

Sample Condition: Acceptable

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPoS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	0.0017	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS	128	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	136	%	AsureQuality Method (LC-MS/MS)
M8PFOS	165 (R)	%	AsureQuality Method (LC-MS/MS)
M4PFBA	133	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	124	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	122	%	AsureQuality Method (LC-MS/MS)
MPFHpA	128	%	AsureQuality Method (LC-MS/MS)
M8PFOA	125	%	AsureQuality Method (LC-MS/MS)
M9PFNA	137	%	AsureQuality Method (LC-MS/MS)
M6PFDA	170 (R)	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	150	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	104	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	70	%	AsureQuality Method (LC-MS/MS)
MPFOSA	73	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	106	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	150	%	AsureQuality Method (LC-MS/MS)



Test	Result	Unit	Method Reference
DNEtFOSE	18 (R)	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	35	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	129	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	102	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	163 (R)	%	AsureQuality Method (LC-MS/MS)
R = Recovery outside method limits			

Customer Sample Name: QAQC04

AsureQuality ID: 18-213312-9

Sample Description: Leachate water - landfill

Sample Condition: Acceptable

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPPrS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFBS *	0.38	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1) *	0.036	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1) *	0.12	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3) *	0.16	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5) *	0.028	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5) *	0.046	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7) *	0.074	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1) *	0.23	µg/L	AsureQuality Method (LC-MS/MS)
PFNS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA *	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA *	0.11	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA *	0.36	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA *	0.086	µg/L	AsureQuality Method (LC-MS/MS)
PFOA *	0.25	µg/L	AsureQuality Method (LC-MS/MS)
PFNA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDODA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
<b>Telomere Sulfonic acids</b>			
4:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS *	96	%	AsureQuality Method (LC-MS/MS)
M3PFHxS *	109	%	AsureQuality Method (LC-MS/MS)
M8PFOS *	109	%	AsureQuality Method (LC-MS/MS)
M4PFBA *	NR	%	AsureQuality Method (LC-MS/MS)
M5PFPeA *	78	%	AsureQuality Method (LC-MS/MS)
M5PFHxA *	108	%	AsureQuality Method (LC-MS/MS)
MPFHpA *	112	%	AsureQuality Method (LC-MS/MS)
M8PFOA *	111	%	AsureQuality Method (LC-MS/MS)
M9PFNA *	109	%	AsureQuality Method (LC-MS/MS)
M6PFDA *	104	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA *	106	%	AsureQuality Method (LC-MS/MS)
MPFDoDA *	107	%	AsureQuality Method (LC-MS/MS)
MPFTeDA *	117	%	AsureQuality Method (LC-MS/MS)
MPFOSA *	108	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA *	108	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA *	110	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA *	104	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA *	117	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE *	113	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE *	108	%	AsureQuality Method (LC-MS/MS)
M4:2FTS *	145	%	AsureQuality Method (LC-MS/MS)
M6:2FTS *	207 (R)	%	AsureQuality Method (LC-MS/MS)
M8:2FTS *	111	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

Customer Sample Name: QAQC05

AsureQuality ID: 18-213312-10

Sample Description: Leachate water - landfill

Sample Condition: Acceptable

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPrS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS	96	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	102	%	AsureQuality Method (LC-MS/MS)
M8PFOS	123	%	AsureQuality Method (LC-MS/MS)
M4PFBA	98	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	96	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	94	%	AsureQuality Method (LC-MS/MS)
MPFHpA	98	%	AsureQuality Method (LC-MS/MS)
M8PFOA	92	%	AsureQuality Method (LC-MS/MS)
M9PFNA	100	%	AsureQuality Method (LC-MS/MS)
M6PFDA	121	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	139	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	157 (R)	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	86	%	AsureQuality Method (LC-MS/MS)
MPFOSA	139	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	135	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	140	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	147	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	142	%	AsureQuality Method (LC-MS/MS)



Test	Result	Unit	Method Reference
M4:2FTS	101	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	75	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	109	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

Customer Sample Name: QAQC06

AsureQuality ID: 18-213312-11

Sample Description: Leachate water - QAQC

Sample Condition: Acceptable

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPrS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDODA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS	91	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	105	%	AsureQuality Method (LC-MS/MS)
M8PFOS	129	%	AsureQuality Method (LC-MS/MS)
M4PFBA	89	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	90	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	89	%	AsureQuality Method (LC-MS/MS)
MPFHpA	92	%	AsureQuality Method (LC-MS/MS)
M8PFOA	90	%	AsureQuality Method (LC-MS/MS)
M9PFNA	99	%	AsureQuality Method (LC-MS/MS)
M6PFDA	122	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	141	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	NR	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	108	%	AsureQuality Method (LC-MS/MS)
MPFOSA	135	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	145	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	141	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	169 (R)	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	149	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	96	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	74	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	94	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

Customer Sample Name: SW02

AsureQuality ID: 18-213312-13

Sample Description: Leachate water

Sample Condition: Acceptable

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPrS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFBS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1) *	0.014	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3) *	0.014	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5) *	0.015	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5) *	0.016	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7) *	0.031	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1) *	0.045	µg/L	AsureQuality Method (LC-MS/MS)
PFNS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA *	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFOA *	0.045	µg/L	AsureQuality Method (LC-MS/MS)
PFNA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS *	97	%	AsureQuality Method (LC-MS/MS)
M3PFHxS *	109	%	AsureQuality Method (LC-MS/MS)
M8PFOS *	108	%	AsureQuality Method (LC-MS/MS)
M4PFBA *	NR	%	AsureQuality Method (LC-MS/MS)
M5PFPeA *	81	%	AsureQuality Method (LC-MS/MS)
M5PFHxA *	104	%	AsureQuality Method (LC-MS/MS)
MPFHpA *	107	%	AsureQuality Method (LC-MS/MS)
M8PFOA *	108	%	AsureQuality Method (LC-MS/MS)
M9PFNA *	103	%	AsureQuality Method (LC-MS/MS)
M6PFDA *	104	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA *	103	%	AsureQuality Method (LC-MS/MS)
MPFDoDA *	103	%	AsureQuality Method (LC-MS/MS)
MPFTeDA *	109	%	AsureQuality Method (LC-MS/MS)
MPFOSA *	108	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA *	102	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA *	98	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA *	102	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA *	107	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE *	103	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE *	100	%	AsureQuality Method (LC-MS/MS)
M4:2FTS *	108	%	AsureQuality Method (LC-MS/MS)
M6:2FTS *	125	%	AsureQuality Method (LC-MS/MS)



Test	Result	Unit	Method Reference
M8:2FTS *	106	%	AsureQuality Method (LC-MS/MS)
Customer Sample Name: GND1723		AsureQuality ID: 18-213312-14	
Sample Condition: Acceptable			
Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Water			
Perfluoroalkylsulfonic acids			
PFPrS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFBS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1) *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA *	<0.20	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFOA *	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA *	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M *	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS *	103	%	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
M3PFHxS *	105	%	AsureQuality Method (LC-MS/MS)
M8PFOS *	104	%	AsureQuality Method (LC-MS/MS)
M4PFBA *	109	%	AsureQuality Method (LC-MS/MS)
M5PFPeA *	104	%	AsureQuality Method (LC-MS/MS)
M5PFHxA *	107	%	AsureQuality Method (LC-MS/MS)
MPFHpA *	107	%	AsureQuality Method (LC-MS/MS)
M8PFOA *	105	%	AsureQuality Method (LC-MS/MS)
M9PFNA *	99	%	AsureQuality Method (LC-MS/MS)
M6PFDA *	104	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA *	103	%	AsureQuality Method (LC-MS/MS)
MPFDODA *	102	%	AsureQuality Method (LC-MS/MS)
MPFTeDA *	95	%	AsureQuality Method (LC-MS/MS)
MPFOSA *	105	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA *	100	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA *	97	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA *	104	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA *	108	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE *	101	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE *	104	%	AsureQuality Method (LC-MS/MS)
M4:2FTS *	95	%	AsureQuality Method (LC-MS/MS)
M6:2FTS *	104	%	AsureQuality Method (LC-MS/MS)
M8:2FTS *	91	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: Duplicate of 18-213312-3

AsureQuality ID: 18-213312-16

Sample Description: AECOM 18-213312-3 duplicate

Sample Condition: Acceptable

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPtS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	NR	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS	93	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	102	%	AsureQuality Method (LC-MS/MS)
M8PFOS	116	%	AsureQuality Method (LC-MS/MS)
M4PFBA	82	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	95	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	96	%	AsureQuality Method (LC-MS/MS)
MPFHpA	96	%	AsureQuality Method (LC-MS/MS)
M8PFOA	95	%	AsureQuality Method (LC-MS/MS)
M9PFNA	98	%	AsureQuality Method (LC-MS/MS)
M6PFDA	121	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	130	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	112	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	69	%	AsureQuality Method (LC-MS/MS)
MPFOSA	142	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	NR	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	124	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	135	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	153 (R)	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	148	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	110	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	77	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	104	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

Customer Sample Name: BB01

AsureQuality ID: 18-201033-12

Sample Description: 'BioBoost' Garden Fertiliser Product (Heat-treated Biosolids - Commercial compost)

Sample Condition: Acceptable

Sampled Date: 07-Aug-2018



Test	Result	Unit	Method Reference
<b>Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPrS *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFBS *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeS *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFHxS (1) *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1) *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFHxS (1) *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFHxS (3) *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpS *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFOS (5) *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFOS (5) *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFOS (5) *	0.0082	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFOS (7) *	0.0082	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1) *	0.0082	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNS *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDS *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA *	<0.0050	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeA *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHxA *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpA *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFOA *	0.0011	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNA *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDA *	0.0030	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFUnDA *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDoDA *	0.0013	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
PFTTrDA *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTeDA *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NEtFOSA-M *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSA-M *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA *	0.0038	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSAA *	0.0029	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSE-M *	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS *	NR	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
6:2 FTS *	NR	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
8:2 FTS *	NR	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS *	57	%	AsureQuality Method (LC-MS/MS)
M3PFHxS *	94	%	AsureQuality Method (LC-MS/MS)
M8PFOS *	94	%	AsureQuality Method (LC-MS/MS)
M4PFBA *	34	%	AsureQuality Method (LC-MS/MS)
M5PFPeA *	45	%	AsureQuality Method (LC-MS/MS)
M5PFHxA *	63	%	AsureQuality Method (LC-MS/MS)
MPFHpA *	85	%	AsureQuality Method (LC-MS/MS)
M8PFOA *	103	%	AsureQuality Method (LC-MS/MS)
M9PFNA *	113	%	AsureQuality Method (LC-MS/MS)
M6PFDA *	108	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA *	111	%	AsureQuality Method (LC-MS/MS)
MPFDoDA *	109	%	AsureQuality Method (LC-MS/MS)
MPFTeDA *	219 (R)	%	AsureQuality Method (LC-MS/MS)
MPFOSA *	64	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA *	15 (R)	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA *	47	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA *	169 (R)	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA *	146	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE *	12 (R)	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE *	32	%	AsureQuality Method (LC-MS/MS)
M4:2FTS *	379 (R)	%	AsureQuality Method (LC-MS/MS)
M6:2FTS *	455 (R)	%	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
M8:2FTS *	325 (R)	%	AsureQuality Method (LC-MS/MS)
R = Recovery outside method limits			

## QC Results

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Relates to sample(s) 18-201033-12

Test	Result	Unit	Method Reference
<b>Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPPrS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.0050	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDODA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)



**Telomere Sulfonic acids**

4:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)

**Internal Standards**

M3PFBS	105	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	105	%	AsureQuality Method (LC-MS/MS)
M8PFOS	103	%	AsureQuality Method (LC-MS/MS)
M4PFBA	108	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	105	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	106	%	AsureQuality Method (LC-MS/MS)
MPFHpA	106	%	AsureQuality Method (LC-MS/MS)
M8PFOA	106	%	AsureQuality Method (LC-MS/MS)
M9PFNA	106	%	AsureQuality Method (LC-MS/MS)
M6PFDA	101	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	91	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	62	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	28 (R)	%	AsureQuality Method (LC-MS/MS)
MPFOSA	99	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	55	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	70	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	71	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	84	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	73	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	83	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	104	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	102	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	100	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

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Relates to sample(s) 18-213312-1, 18-213312-5, 18-213312-9, 18-213312-13, 18-213312-14

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPoS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.010	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.20	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS	104	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	108	%	AsureQuality Method (LC-MS/MS)
M8PFOS	106	%	AsureQuality Method (LC-MS/MS)
M4PFBA	105	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	107	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	102	%	AsureQuality Method (LC-MS/MS)
MPFHpA	107	%	AsureQuality Method (LC-MS/MS)
M8PFOA	108	%	AsureQuality Method (LC-MS/MS)
M9PFNA	104	%	AsureQuality Method (LC-MS/MS)
M6PFDA	108	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	105	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	102	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	98	%	AsureQuality Method (LC-MS/MS)
MPFOSA	106	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	106	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	99	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	103	%	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
DNMeFOSAA	107	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	104	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	103	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	105	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	109	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	97	%	AsureQuality Method (LC-MS/MS)

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Relates to sample(s) 18-213312-2, 18-213312-3, 18-213312-4, 18-213312-6, 18-213312-7, 18-213312-8, 18-213312-10, 18-213312- 11, 18-213312-16

Test	Result	Unit	Method Reference
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**Poly- and Perfluorinated Alkyl Substances (PFAS) in Water****Perfluoroalkylsulfonic acids**

PFPrS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

**Perfluoroalkylcarboxylic acids**

PFBA	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

**Perfluorooctanesulfonamides**

PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)

**Perfluorooctanesulfonamidoacetic acids**

NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

**Perfluorooctanesulfonamidoethanols**

NEtFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)

**Telomere Sulfonic acids**

4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

**Internal Standards**

M3PFBS	100	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	110	%	AsureQuality Method (LC-MS/MS)
M8PFOS	131	%	AsureQuality Method (LC-MS/MS)
M4PFBA	105	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	100	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	100	%	AsureQuality Method (LC-MS/MS)
MPFHpA	102	%	AsureQuality Method (LC-MS/MS)
M8PFOA	104	%	AsureQuality Method (LC-MS/MS)
M9PFNA	110	%	AsureQuality Method (LC-MS/MS)
M6PFDA	126	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	150	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	168 (R)	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	173 (R)	%	AsureQuality Method (LC-MS/MS)
MPFOSA	120	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	132	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	172 (R)	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	140	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	132	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	114	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	110	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	108	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	110	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	108	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

**Analysis Summary****Wellington Laboratory**

Analysis	Method	Accreditation	Authorised by
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
DX-PFCS01, 03-SUITE_B	AsureQuality Method (LC-MS/MS)	IANZ	Cameron Evans, Lauren Fleury



Analysis	Method	Accreditation	Authorised by
di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)			
mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)			
L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)			
Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)			
di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)			
mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)			
L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)			
Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)			
Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)			
For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.			

Reported results are corrected for internal standard recovery

#### Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids

DX-PFCS02, 03-SUITE_B	AsureQuality Method (LC-MS/MS)	Not Accredited	Lisa Graham
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di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)

mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)

L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)

Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)

di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)

mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)

L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)

Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)

Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)

For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.

Reported results are corrected for internal standard recovery

Any tests marked with \* are not accredited for specific matrices or analytes.

Results that are prefixed with '<' indicate the lowest level at which the analyte can be reported, and that in this case the analyte was not observed above this limit.

NR = Not Reportable



**Cameron Evans**  
Scientist



**Lauren Fleury**  
Scientist



**Lisa Graham**  
Scientist / Team Leader

#### Accreditation



## Appendix

### Analyte LOR Summary

#### Poly- and Perfluorinated Alkyl Substances (PFAS) in Water - AsureQuality Method (LC-MS/MS)

**Analyte** **LOR (µg/L)**

Listing applies to samples: 18-213312-1, 18-213312-13, 18-213312-14, 18-213312-5, 18-213312-9

##### Perfluoroalkylsulfonic acids

PFPPrS*	0.0010
PFBS*	0.0010
PFPeS*	0.0010
di-PFHxS (1)*	0.0010
mono-PFHxS (1)*	0.0010
L-PFHxS (1)*	0.0010
Total PFHxS (3)*	0.0010
PFHpS*	0.0010
di-PFOS (5)*	0.0010
mono-PFOS (5)*	0.0010
L-PFOS (5)*	0.0010
Total PFOS (7)*	0.0010
Sum PFHxS+PFOS (1)*	0.0010
PFNS*	0.0010
PFDS*	0.0010

##### Perfluoroalkylcarboxylic acids

PFBA*	NR
PFPeA*	0.0010
PFHxA*	0.0010
PFHpA*	0.0010
PFOA*	0.0010
PFNA*	0.0010
PFDA*	0.0010
PFUnDA*	0.0010
PFDoDA*	0.0010
PFTTrDA*	0.0010
PFTeDA*	0.0010

##### Perfluorooctanesulfonamides

PFOSA*	0.0010
NEtFOSA-M*	0.0010
NMeFOSA-M*	0.0010

##### Perfluorooctanesulfonamidoacetic acids

NEtFOSAA*	0.0010
NMeFOSAA*	0.0010

##### Perfluorooctanesulfonamidoethanols

NEtFOSE-M*	0.0010
NMeFOSE-M*	0.0010

##### Telomere Sulfonic acids

4:2 FTS*	0.0010
6:2 FTS*	0.0010
8:2 FTS*	0.0010

Listing applies to samples: 18-213312-10, 18-213312-11, 18-213312-16, 18-213312-2, 18-213312-3, 18-213312-4, 18-213312-6, 18-213312-7, 18-213312-8

PFPPrS	0.0010
PFBS	0.0010

PFPeS	0.0010
di-PFHxS (1)	0.0010
mono-PFHxS (1)	0.0010
L-PFHxS (1)	0.0010
Total PFHxS (3)	0.0010
PFHpS	0.0010
di-PFOS (5)	0.0010
mono-PFOS (5)	0.0010
L-PFOS (5)	0.0010
Total PFOS (7)	0.0010
Sum PFHxS+PFOS (1)	0.0010
PFNS	0.0010
PFDS	0.0010
<b>Perfluoroalkylcarboxylic acids</b>	
PFBA	0.0010
PFPeA	0.0010
PFHxA	0.0010
PFHpA	0.0010
PFOA	0.0010
PFNA	0.0010
PFDA	0.0010
PFUnDA	0.0010
PFDODA	0.0010
PFTTrDA	0.0010
PFTeDA	0.0010
<b>Perfluorooctanesulfonamides</b>	
PFOSA	0.0010
NEtFOSA-M	NR
NMeFOSA-M	NR
<b>Perfluorooctanesulfonamidoacetic acids</b>	
NEtFOSAA	0.0010
NMeFOSAA	0.0010
<b>Perfluorooctanesulfonamidoethanols</b>	
NEtFOSE-M	0.0010
NMeFOSE-M	0.0010
<b>Telomere Sulfonic acids</b>	
4:2 FTS	0.0010
6:2 FTS	0.0010
8:2 FTS	0.0010

**Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids - AsureQuality Method (LC-MS/MS)****Analyte** **LOR (mg/kg (dry weight))**

Listing applies to samples: 18-201033-12

**Perfluoroalkylsulfonic acids**

PFPPrS*	0.0010
PFBS*	0.0010
PFPeS*	0.0010
di-PFHxS (1)*	0.0010
mono-PFHxS (1)*	0.0010
L-PFHxS (1)*	0.0010
Total PFHxS (3)*	0.0010
PFHpS*	0.0010

di-PFOS (5)*	0.0010
mono-PFOS (5)*	0.0010
L-PFOS (5)*	0.0010
Total PFOS (7)*	0.0010
Sum PFHxS+PFOS (1)*	0.0010
PFNS*	0.0010
PFDS*	0.0010
<b>Perfluoroalkylcarboxylic acids</b>	
PFBA*	0.0010
PFPeA*	0.0010
PFHxA*	0.0010
PFHpA*	0.0010
PFOA*	0.0010
PFNA*	0.0010
PFDA*	0.0010
PFUnDA*	0.0010
PFDoDA*	0.0010
PFTrDA*	0.0010
PFTeDA*	0.0010
<b>Perfluorooctanesulfonamides</b>	
PFOSA*	0.0010
NEtFOSA-M*	0.0010
NMeFOSA-M*	0.0010
<b>Perfluorooctanesulfonamidoacetic acids</b>	
NEtFOSAA*	0.0010
NMeFOSAA*	0.0010
<b>Perfluorooctanesulfonamidoethanols</b>	
NEtFOSE-M*	0.0010
NMeFOSE-M*	0.0010
<b>Telomere Sulfonic acids</b>	
4:2 FTS*	NR
6:2 FTS*	NR
8:2 FTS*	NR

## Analyte Definitions

### Poly- and Perfluorinated Alkyl Substances (PFAS) in Water - AsureQuality Method (LC-MS/MS)

**Analyte** **Full Name**

Listing applies to samples: 18-213312-1, 18-213312-13, 18-213312-14, 18-213312-5, 18-213312-9

#### Perfluoroalkylsulfonic acids

PFPPrS*	Perfluoro-1-propanesulfonic acid
PFBS*	Perfluoro-1-butanesulfonic acid
PFPeS*	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)*	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)*	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)*	Linear Perfluorohexanesulfonic acid
PFHpS*	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)*	Total Perfluorodimethylhexane sulfonic acids
mono-PFOS (5)*	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)*	Linear Perfluorooctanesulfonic acid
PFNS*	Perfluoro-1-nonanesulfonic acid
PFDS*	Perfluoro-1-decanesulfonic acid

#### Perfluoroalkylcarboxylic acids

PFBA*	Perfluoro-n-butanoic acid
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Analyte	Full Name
PFPeA*	Perfluoro-n-pentanoic acid
PFHxA*	Perfluoro-n-hexanoic acid
PFHpA*	Perfluoro-n-heptanoic acid
PFOA*	Perfluoro-n-octanoic acid
PFNA*	Perfluoro-n-nonanoic acid
PFDA*	Perfluoro-n-decanoic acid
PFUnDA*	Perfluoro-n-undecanoic acid
PFDoDA*	Perfluoro-n-dodecanoic acid
PFTTrDA*	Perfluoro-n-tridecanoic acid
PFTeDA*	Perfluoro-n-tetradecanoic acid
<b>Perfluorooctanesulfonamides</b>	
PFOSA*	Perfluoro-1-octanesulfonamide
NEtFOSA-M*	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M*	N-methylperfluoro-1-octanesulfonamide
<b>Perfluorooctanesulfonamidoacetic acids</b>	
NEtFOSAA*	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA*	N-methylperfluoro-1-octanesulfonamidoacetic acid
<b>Perfluorooctanesulfonamidoethanols</b>	
NEtFOSE-M*	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M*	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
<b>Telomere Sulfonic acids</b>	
4:2 FTS*	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS*	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS*	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid
<b>Internal Standards</b>	
M3PFBS*	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS*	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS*	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA*	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA*	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA*	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA*	Perfluoro-n-[1,2,3,4-13C4]heptanoic acid
M8PFOA*	Perfluoro-n-[13C8]octanoic acid
M9PFNA*	Perfluoro-n-[13C9]nonanoic acid
M6PFDA*	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA*	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid
MPFDoDA*	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA*	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA*	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA*	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA*	N-methyl-D3-perfluoro-1-octanesulfonamide
DNEtFOSAA*	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA*	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNEtFOSE*	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE*	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS*	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS*	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS*	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid
<b>Listing applies to samples: 18-213312-10, 18-213312-11, 18-213312-16, 18-213312-2, 18-213312-3, 18-213312-4, 18-213312-6, 18-213312-7, 18-213312-8</b>	
<b>Perfluoroalkylsulfonic acids</b>	
PFPPrS	Perfluoro-1-propanesulfonic acid
PFBS	Perfluoro-1-butanefulfonic acid
PFPeS	Perfluoro-1-pentanesulfonic acid

Analyte	Full Name
di-PFHxS (1)	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)	Linear Perfluorohexanesulfonic acid
PFHpS	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)	Total Perfluorodimethylhexane sulfonic acids
mono-PFOS (5)	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)	Linear Perfluorooctanesulfonic acid
PFNS	Perfluoro-1-nonanesulfonic acid
PFDS	Perfluoro-1-decanesulfonic acid
<b>Perfluoroalkylcarboxylic acids</b>	
PFBA	Perfluoro-n-butanoic acid
PFPeA	Perfluoro-n-pentanoic acid
PFHxA	Perfluoro-n-hexanoic acid
PFHpA	Perfluoro-n-heptanoic acid
PFOA	Perfluoro-n-octanoic acid
PFNA	Perfluoro-n-nonanoic acid
PFDA	Perfluoro-n-decanoic acid
PFUnDA	Perfluoro-n-undecanoic acid
PFDoDA	Perfluoro-n-dodecanoic acid
PFTeDA	Perfluoro-n-tridecanoic acid
PFTeDA	Perfluoro-n-tetradecanoic acid
<b>Perfluorooctanesulfonamides</b>	
PFOSA	Perfluoro-1-octanesulfonamide
NEtFOSA-M	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M	N-methylperfluoro-1-octanesulfonamide
<b>Perfluorooctanesulfonamidoacetic acids</b>	
NEtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid
<b>Perfluorooctanesulfonamidoethanols</b>	
NEtFOSE-M	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
<b>Telomere Sulfonic acids</b>	
4:2 FTS	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid
<b>Internal Standards</b>	
M3PFBS	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA	Perfluoro-n-[1,2,3,4-13C4]heptanoic acid
M8PFOA	Perfluoro-n-[13C8]octanoic acid
M9PFNA	Perfluoro-n-[13C9]nonanoic acid
M6PFDA	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid
MPFDoDA	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA	N-methyl-D3-perfluoro-1-octanesulfonamide
DNEtFOSAA	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid

Analyte	Full Name
DNEtFOSE	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid

#### Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids - AsureQuality Method (LC-MS/MS)

Analyte	Full Name
Listing applies to samples: 18-201033-12	
<b>Perfluoroalkylsulfonic acids</b>	
PFPrS*	Perfluoro-1-propanesulfonic acid
PFBS*	Perfluoro-1-butanesulfonic acid
PFPeS*	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)*	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)*	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)*	Linear Perfluorohexanesulfonic acid
PFHpS*	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)*	Total Perfluorodimethylhexane sulfonic acids
mono-PFOS (5)*	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)*	Linear Perfluorooctanesulfonic acid
PFNS*	Perfluoro-1-nonanesulfonic acid
PFDS*	Perfluoro-1-decanesulfonic acid

#### Perfluoroalkylcarboxylic acids

PFBA*	Perfluoro-n-butanoic acid
PFPeA*	Perfluoro-n-pentanoic acid
PFHxA*	Perfluoro-n-hexanoic acid
PFHpA*	Perfluoro-n-heptanoic acid
PFOA*	Perfluoro-n-octanoic acid
PFNA*	Perfluoro-n-nonanoic acid
PFDA*	Perfluoro-n-decanoic acid
PFUnDA*	Perfluoro-n-undecanoic acid
PFDoDA*	Perfluoro-n-dodecanoic acid
PFTTrDA*	Perfluoro-n-tridecanoic acid
PFTeDA*	Perfluoro-n-tetradecanoic acid

#### Perfluorooctanesulfonamides

PFOSA*	Perfluoro-1-octanesulfonamide
NEtFOSA-M*	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M*	N-methylperfluoro-1-octanesulfonamide

#### Perfluorooctanesulfonamidoacetic acids

NEtFOSAA*	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA*	N-methylperfluoro-1-octanesulfonamidoacetic acid

#### Perfluorooctanesulfonamidoethanols

NEtFOSE-M*	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M*	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol

#### Telomere Sulfonic acids

4:2 FTS*	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS*	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS*	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid

#### Internal Standards

M3PFBS*	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS*	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS*	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA*	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA*	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid

Analyte	Full Name
M5PFHxA*	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA*	Perfluoro-n-[1,2,3,4-13C4]heptanoic acid
M8PFOA*	Perfluoro-n-[13C8]octanoic acid
M9PFNA*	Perfluoro-n-[13C9]nonanoic acid
M6PFDA*	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA*	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid
MPFDoDA*	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA*	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA*	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA*	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA*	N-methyl-D3-perfluoro-1-octanesulfonamide
DNEtFOSAA*	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA*	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNEtFOSE*	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE*	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS*	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS*	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS*	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid

Any tests marked with \* are not accredited for specific matrices or analytes.

LOR = Limit of Reporting

LOD = Limit of Detection

NR = Not Reportable



# Food and Environmental Submission Form/Chain of Custody

<b>Customer Details</b> Company Name:* AECOM NZ LTD Contact Person:* SEAN HUDGENS Email:* SEAN.HUDGENS@AECOM.COM Contact Phone No.:* 022 085 0612 Address:    Submission Ref.: <i>TRC-PFAS-2018</i> Purchase Order No.: <i>73494</i> Contract/Quote No.: <i>TBC</i>	<b>Reporting Details</b> Report Results To:* SEAN.HUDGENS@AECOM.COM Extra Copies To:  Report each sample separately?* <input type="checkbox"/> Yes <input type="checkbox"/> No If multiple samples are listed below, tick yes to receive an individual CoA for each sample.  Sample Sent By (Name):* <i>REBECCA JOYCE</i> Signed By:* <i>[Signature]</i> Date/Time Dispatched: Condition sample(s) dispatched in: <input type="checkbox"/> Ambient <input checked="" type="checkbox"/> Chilled <input type="checkbox"/> Frozen <input type="checkbox"/> Quarantine (Include a copy of the MPI Import Permit/Transfer Form stating country of origin) <input type="checkbox"/> Return sample(s) after analysis (Courier fees apply) NOTE: Samples will be discarded/returned 8 weeks after reporting unless otherwise instructed. AQ to composite samples? <input type="checkbox"/> Yes <input type="checkbox"/> No Are samples hazardous to health?* <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Water samples submitted?* <input type="checkbox"/> Potable <input checked="" type="checkbox"/> Non-Potable	<div style="text-align: center; color: #ccc;">AQ Project Reference <small>(AQ Use Only)</small></div> <hr/> <b>AsureQuality Limited</b> Wellington Laboratory 1C Quadrant Drive, Waiwhetu Lower Hutt 5010 New Zealand Tel: +64 4 570 8359 Email: GracefieldSR@asurequality.com  <b>Urgency Details*</b> <input checked="" type="checkbox"/> Normal Turn-around-time (TAT) <input type="checkbox"/> Urgent Service (please select from options below) <input type="checkbox"/> Half quoted TAT (50% surcharge) <input type="checkbox"/> Quarter quoted TAT (100% surcharge) NOTE: For urgent testing, please contact AQ prior to submitting samples to confirm availability.
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Sample Name* <small>(unique sample identifier)</small>	Sample Type* <small>(Type of product/substance/material E.g., Potable Water, Soil, Biota Product, Apple, Cow Liver, Apple, Honey, Spinach)</small>	Sample Description <small>(additional sample information, to appear on report)</small>	Sampled Date <small>(used to determine holding time, if applicable)</small>	Testing Requirements* <small>(test or compounds to be tested for)</small>	AQ Ref. only
✓ GND 2285	GROUND WATER		6/8/18	DX-PFCS01	
✓ GND 2677	↓		↓		
✓ GND 2740					
✓ GND 0508	↓				
✓ SWO 1	LEACHATE WATER	- LANDFILL	7/8/18		
✓ QAQCO1	GROUND WATER		6/8/18		
✓ QAQCO2	↓		↓		
✓ QAQCO3					
✓ QAQCO4	LEACHATE WATER	- LANDFILL	7/8/18		

\*Required information

Comments/Additional Information:	Received By (Name):* Signed By:*	Receipt Details <small>(AQ Use Only)</small>
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✓ QAQC05	LEACHATE WATER	-LANDFILL	7/8/18	DX-PFCS01
✓ QAQC06	LEACHATE WATER	-QAQL	↓	↓
✓ BBO1	'BIOBOOST' GARDEN FERTILIZER PRODUCT	HEAT-TREATED BIO-SOLIDS - COMMERCIAL COMPOST	7/8/18	TBC (contact sean.hudgens @accom.com)
✓ SW02	LEACHATE WATER		7/8/18	DX-PFCS01
✓ GND1723	GROUND WATER		6/8/18	DX-PFCS01

# Certificate of Analysis

**Submission Reference: TRC\_PFAS\_2018**

**Final Report**

**Sean Hudgens**  
**AECOM Consulting Services - Wellington**  
**PO Box 27277**  
**Wellington 6141**  
**New Zealand**

PO Number: 73494

Submitted by:  
 Taranaki Regional Council  
 Private Bag 713  
 Stratford 4352  
 New Zealand

Report Issued: 19-Sep-2018

AsureQuality Reference: **18-201031**

Sample(s) Received: 08-Aug-2018 08:00

## Results

The tests were performed on the samples as received.

**Customer Sample Name:** WW01 **AsureQuality ID:** 18-201031-1

**Sample Description:** Effluent Sample

**Sample Condition:** Acceptable

**Sampled Date:** 07-Aug-2018

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPtS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	0.0054	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	0.0023	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	0.0023	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	0.0033	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	0.0028	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	0.0082	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	0.0014	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	0.0040	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDODA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality has used reasonable skill, care, and effort to provide an accurate analysis of the sample(s) which form(s) the subject of this report. However, the accuracy of this analysis is reliant on, and subject to, the sample(s) provided by you and your responsibility as to transportation of the sample(s). AsureQuality's standard terms of business apply to the analysis set out in this report.

**Report Number:** 1241691

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Test	Result	Unit	Method Reference
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	NR	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	NR	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	NR	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS	64	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	100	%	AsureQuality Method (LC-MS/MS)
M8PFOS	103	%	AsureQuality Method (LC-MS/MS)
M4PFBA	NR	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	63	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	88	%	AsureQuality Method (LC-MS/MS)
MPFHpA	109	%	AsureQuality Method (LC-MS/MS)
M8PFOA	120	%	AsureQuality Method (LC-MS/MS)
M9PFNA	134	%	AsureQuality Method (LC-MS/MS)
M6PFDA	124	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	125	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	159 (R)	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	277 (R)	%	AsureQuality Method (LC-MS/MS)
MPFOSA	82	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	77	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	75	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	186 (R)	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	205 (R)	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	112	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	118	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	NR	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	NR	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	NR	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

**Subcontracted Tests**

Gamma Irradiation	Complete	Subcontracted to MSD Animal Health Upper Hutt
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**Customer Sample Name:** WW02**AsureQuality ID:** 18-201031-2**Sample Description:** Influent Sample**Sample Condition:** Acceptable**Sampled Date:** 07-Aug-2018

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water - High Level</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPrS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)



Test	Result	Unit	Method Reference
PFBS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFDODA	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<20	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS	106	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	105	%	AsureQuality Method (LC-MS/MS)
M8PFOS	105	%	AsureQuality Method (LC-MS/MS)
M4PFBA	101	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	102	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	108	%	AsureQuality Method (LC-MS/MS)
MPFHpA	109	%	AsureQuality Method (LC-MS/MS)
M8PFOA	108	%	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
M9PFNA	109	%	AsureQuality Method (LC-MS/MS)
M6PFDA	116	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	112	%	AsureQuality Method (LC-MS/MS)
MPFDODA	110	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	123	%	AsureQuality Method (LC-MS/MS)
MPFOSA	111	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	110	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	108	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	106	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	99	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	111	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	105	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	117	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	122	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	115	%	AsureQuality Method (LC-MS/MS)
<b>Subcontracted Tests</b>			
Gamma Irradiation	Complete		Subcontracted to MSD Animal Health Upper Hutt

## QC Results

### Blank

Relates to sample(s) 18-201031-1

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPPrS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
PfUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PfDoDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PfTrDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PfTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
<b>Internal Standards</b>			
M3PFBS	115	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	112	%	AsureQuality Method (LC-MS/MS)
M8PFOS	113	%	AsureQuality Method (LC-MS/MS)
M4PFBA	125	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	114	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	121	%	AsureQuality Method (LC-MS/MS)
MPFHpA	115	%	AsureQuality Method (LC-MS/MS)
M8PFOA	119	%	AsureQuality Method (LC-MS/MS)
M9PFNA	117	%	AsureQuality Method (LC-MS/MS)
M6PFDA	114	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	106	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	98	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	136	%	AsureQuality Method (LC-MS/MS)
MPFOSA	118	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	119	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	134	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	120	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	131	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	123	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	133	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	120	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	130	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	126	%	AsureQuality Method (LC-MS/MS)

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Relates to sample(s) 18-201031-2

Test	Result	Unit	Method Reference
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water - High Level</b>			
<b>Perfluoroalkylsulfonic acids</b>			
PFPoS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPoS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluoroalkylcarboxylic acids</b>			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPoS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFDODA	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<5.0	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<20	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamides</b>			
PFOSA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoacetic acids</b>			
NEtFOSAA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
<b>Perfluorooctanesulfonamidoethanols</b>			
NEtFOSE-M	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<1.0	µg/L	AsureQuality Method (LC-MS/MS)
<b>Telomere Sulfonic acids</b>			
4:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)



**Internal Standards**

M3PFBS	104	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	102	%	AsureQuality Method (LC-MS/MS)
M8PFOS	104	%	AsureQuality Method (LC-MS/MS)
M4PFBA	107	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	102	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	101	%	AsureQuality Method (LC-MS/MS)
MPFHpA	102	%	AsureQuality Method (LC-MS/MS)
M8PFOA	104	%	AsureQuality Method (LC-MS/MS)
M9PFNA	105	%	AsureQuality Method (LC-MS/MS)
M6PFDA	106	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	104	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	104	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	109	%	AsureQuality Method (LC-MS/MS)
MPFOSA	108	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	104	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	98	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	101	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	106	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	100	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	104	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	104	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	107	%	AsureQuality Method (LC-MS/MS)

**Analysis Summary****Wellington Laboratory**

Analysis	Method	Accreditation	Authorised by
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water</b>			
DX-PFCS01, 03-SUITE_B	AsureQuality Method (LC-MS/MS)	IANZ	Cameron Evans

di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)

mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)

L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)

Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)

di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)

mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)

L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)

Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)

Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)

For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.

Reported results are corrected for internal standard recovery

Analysis	Method	Accreditation	Authorised by
<b>Poly- and Perfluorinated Alkyl Substances (PFAS) in Water - High Level</b>			
DX-PFCS01, 05-HIGHLEVEL	AsureQuality Method (LC-MS/MS)	IANZ	Cameron Evans

di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)

mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)

L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)

Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)

di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)

mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)

L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)

Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)

Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)

For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.

Reported results are corrected for internal standard recovery

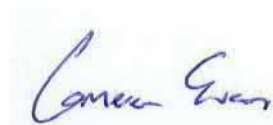
## MSD Animal Health Upper Hutt, Upper Hutt (Subcontracted)

33 Whakatiki St, Trentham | Upper Hutt 5018 | New Zealand

Analysis	Method	Accreditation
<b>Gamma Irradiation</b>		
SC-GAMA01, 01-DEFAULT	Subcontracted to MSD Animal Health Upper Hutt	NA - Subcontracted

Results that are prefixed with '<' indicate the lowest level at which the analyte can be reported, and that in this case the analyte was not observed above this limit.

NR = Not Reportable



**Cameron Evans**

Scientist

## Accreditation



## Appendix

### Analyte LOR Summary

#### Poly- and Perfluorinated Alkyl Substances (PFAS) in Water - AsureQuality Method (LC-MS/MS)

**Analyte** **LOR (µg/L)**

Listing applies to samples: 18-201031-1

##### Perfluoroalkylsulfonic acids

PFPPrS	0.0010
PFBS	0.0010
PFPeS	0.0010
di-PFHxS (1)	0.0010
mono-PFHxS (1)	0.0010
L-PFHxS (1)	0.0010
Total PFHxS (3)	0.0010
PFHpS	0.0010
di-PFOS (5)	0.0010
mono-PFOS (5)	0.0010
L-PFOS (5)	0.0010
Total PFOS (7)	0.0010
Sum PFHxS+PFOS (1)	0.0010
PFNS	0.0010
PFDS	0.0010

##### Perfluoroalkylcarboxylic acids

PFBA	NR
PFPeA	0.0010
PFHxA	0.0010
PFHpA	0.0010
PFOA	0.0010
PFNA	0.0010
PFDA	0.0010
PFUnDA	0.0010
PFDoDA	0.0010
PFTTrDA	0.0010
PFTeDA	0.0010

##### Perfluorooctanesulfonamides

PFOSA	0.0010
NEtFOSA-M	0.0010
NMeFOSA-M	0.0010

##### Perfluorooctanesulfonamidoacetic acids

NEtFOSAA	0.0010
NMeFOSAA	0.0010

##### Perfluorooctanesulfonamidoethanols

NEtFOSE-M	0.0010
NMeFOSE-M	0.0010

##### Telomere Sulfonic acids

4:2 FTS	NR
6:2 FTS	NR
8:2 FTS	NR

**Poly- and Perfluorinated Alkyl Substances (PFAS) in Water - High Level - AsureQuality Method (LC-MS/MS)**

Analyte	LOR (µg/L)
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Listing applies to samples: 18-201031-2

**Perfluoroalkylsulfonic acids**

PFPoS	0.10
PFBS	0.10
PFPeS	0.10
di-PFHxS (1)	0.10
mono-PFHxS (1)	0.10
L-PFHxS (1)	0.10
Total PFHxS (3)	0.10
PFHpS	0.10
di-PFOS (5)	0.10
mono-PFOS (5)	0.10
L-PFOS (5)	0.10
Total PFOS (7)	0.10
Sum PFHxS+PFOS (1)	0.10
PFNS	0.10
PFDS	0.10

**Perfluoroalkylcarboxylic acids**

PFBA	0.10
PFPeA	0.10
PFHxA	0.10
PFHpA	0.10
PFOA	0.10
PFNA	0.10
PFDA	0.10
PFUnDA	0.10
PFDoDA	0.10
PFTTrDA	0.10
PFTeDA	0.10

**Perfluorooctanesulfonamides**

PFOSA	0.10
NEtFOSA-M	0.10
NMeFOSA-M	0.10

**Perfluorooctanesulfonamidoacetic acids**

NEtFOSAA	0.10
NMeFOSAA	0.10

**Perfluorooctanesulfonamidoethanols**

NEtFOSE-M	0.10
NMeFOSE-M	0.10

**Telomere Sulfonic acids**

4:2 FTS	0.10
6:2 FTS	0.10
8:2 FTS	0.10

**Analyte Definitions****Poly- and Perfluorinated Alkyl Substances (PFAS) in Water - AsureQuality Method (LC-MS/MS)**

Analyte	Full Name
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Listing applies to samples: 18-201031-1

**Perfluoroalkylsulfonic acids**

PFPoS	Perfluoro-1-propanesulfonic acid
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Analyte	Full Name
PFBS	Perfluoro-1-butanefulfonic acid
PFPeS	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)	Linear Perfluorohexanesulfonic acid
PFHpS	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)	Total Perfluorodimethylhexane sulfonic acids
mono-PFOS (5)	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)	Linear Perfluorooctanesulfonic acid
PFNS	Perfluoro-1-nonanesulfonic acid
PFDS	Perfluoro-1-decanesulfonic acid
<b>Perfluoroalkylcarboxylic acids</b>	
PFBA	Perfluoro-n-butanoic acid
PFPeA	Perfluoro-n-pentanoic acid
PFHxA	Perfluoro-n-hexanoic acid
PFHpA	Perfluoro-n-heptanoic acid
PFOA	Perfluoro-n-octanoic acid
PFNA	Perfluoro-n-nonanoic acid
PFDA	Perfluoro-n-decanoic acid
PFUnDA	Perfluoro-n-undecanoic acid
PFDoDA	Perfluoro-n-dodecanoic acid
PFTTrDA	Perfluoro-n-tridecanoic acid
PFTeDA	Perfluoro-n-tetradecanoic acid
<b>Perfluorooctanesulfonamides</b>	
PFOSA	Perfluoro-1-octanesulfonamide
NEtFOSA-M	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M	N-methylperfluoro-1-octanesulfonamide
<b>Perfluorooctanesulfonamidoacetic acids</b>	
NEtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid
<b>Perfluorooctanesulfonamidoethanols</b>	
NEtFOSE-M	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
<b>Telomere Sulfonic acids</b>	
4:2 FTS	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid
<b>Internal Standards</b>	
M3PFBS	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA	Perfluoro-n-[1,2,3,4-13C4]heptanoic acid
M8PFOA	Perfluoro-n-[13C8]octanoic acid
M9PFNA	Perfluoro-n-[13C9]nonanoic acid
M6PFDA	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid
MPFDoDA	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA	N-methyl-D3-perfluoro-1-octanesulfonamide

Analyte	Full Name
DNEtFOSAA	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNEtFOSE	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid

**Poly- and Perfluorinated Alkyl Substances (PFAS) in Water - High Level - AsureQuality Method (LC-MS/MS)**

Analyte	Full Name
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Listing applies to samples: 18-201031-2

**Perfluoroalkylsulfonic acids**

PFPPrS	Perfluoro-1-propanesulfonic acid
PFBS	Perfluoro-1-butanesulfonic acid
PFPeS	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)	Linear Perfluorohexanesulfonic acid
PFHpS	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)	Total Perfluorodimethylhexane sulfonic acids
mono-PFOS (5)	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)	Linear Perfluorooctanesulfonic acid
PFNS	Perfluoro-1-nonanesulfonic acid
PFDS	Perfluoro-1-decanesulfonic acid

**Perfluoroalkylcarboxylic acids**

PFBA	Perfluoro-n-butanoic acid
PFPeA	Perfluoro-n-pentanoic acid
PFHxA	Perfluoro-n-hexanoic acid
PFHpA	Perfluoro-n-heptanoic acid
PFOA	Perfluoro-n-octanoic acid
PFNA	Perfluoro-n-nonanoic acid
PFDA	Perfluoro-n-decanoic acid
PFUnDA	Perfluoro-n-undecanoic acid
PFDoDA	Perfluoro-n-dodecanoic acid
PFTTrDA	Perfluoro-n-tridecanoic acid
PFTeDA	Perfluoro-n-tetradecanoic acid

**Perfluorooctanesulfonamides**

PFOSA	Perfluoro-1-octanesulfonamide
NEtFOSA-M	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M	N-methylperfluoro-1-octanesulfonamide

**Perfluorooctanesulfonamidoacetic acids**

NEtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid

**Perfluorooctanesulfonamidoethanols**

NEtFOSE-M	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol

**Telomere Sulfonic acids**

4:2 FTS	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid

**Internal Standards**

M3PFBS	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA	Perfluoro-n-[1,2,3,4-13C4]butanoic acid

Analyte	Full Name
M5PFPeA	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA	Perfluoro-n-[1,2,3,4-13C4]heptanoic acid
M8PFOA	Perfluoro-n-[13C8]octanoic acid
M9PFNA	Perfluoro-n-[13C9]nonanoic acid
M6PFDA	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid
MPFDoDA	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA	N-methyl-D3-perfluoro-1-octanesulfonamide
DNEtFOSAA	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNEtFOSE	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid

LOR = Limit of Reporting

LOD = Limit of Detection

NR = Not Reportable

# Food and Environmental Submission Form/Chain of Custody

<b>Customer Details</b> Company Name: * AECOM NZ LTD Contact Person: * SEAN HUDGENS Email: * SEAN.HUDGENS@AECOM.COM Contact Phone No.: * 022 085 0612 Address:    Submission Ref.: <i>TRL-PAS-2018</i> Purchase Order No.: <i>73494</i> Contract/Quote No.: <i>TBC</i>	<b>Reporting Details</b> Report Results To: * SEAN.HUDGENS@AECOM.COM Extra Copies To:  Report each sample separately? * <input type="checkbox"/> Yes <input type="checkbox"/> No If multiple samples are listed below, tick yes to receive an individual CoA for each sample.  Sample Sent By (Name): * <i>REBECCA JOYCE</i> Signed By: * <i>[Signature]</i> Date/Time Dispatched: Condition sample(s) dispatched in: <input type="checkbox"/> Ambient <input checked="" type="checkbox"/> Chilled <input type="checkbox"/> Frozen <input type="checkbox"/> Quarantine (include a copy of the MPI Import Permit/Transfer Form stating country of origin) <input type="checkbox"/> Return sample(s) after analysis (Courier fees apply) NOTE: Samples will be discarded/returned 8 weeks after reporting unless otherwise instructed. AQ to composite samples? <input type="checkbox"/> Yes <input type="checkbox"/> No Are samples hazardous to health? * <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Water samples submitted? * <input type="checkbox"/> Potable <input checked="" type="checkbox"/> Non-Potable	<b>AQ Project Reference</b> <i>10001202 (Only)</i> <b>AsureQuality Limited</b> Wellington Laboratory 1C Quadrant Drive, Waiwhetu Lower Hutt 5010 New Zealand Tel: +64 4 570 8359 Email: GracefieldSR@asurequality.com <b>Urgency Details*</b> <input checked="" type="checkbox"/> Normal Turn-around-time (TAT) <input type="checkbox"/> Urgent Service (please select from options below) <input type="checkbox"/> Half quoted TAT (50% surcharge) <input type="checkbox"/> Quarter quoted TAT (100% surcharge) NOTE: For urgent testing, please contact AQ prior to submitting samples to confirm availability.
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Sample Name* (unique sample identifier)	Sample Type* (Type of product/substance/material E.g., Potable Water, Soil, Biota Product, Apple, Cow Liver, Apple, Honey, Salmon)	Sample Description (additional sample information, to appear on report)	Sampled Date (used to determine holding time, if applicable)	Testing Requirements* (test or compounds to be tested for)	AQ Ref. only
<i>WW01</i>	<i>WASTEWATER</i>	<i>EFFLUENT SAMPLE</i>	<i>7/8/18</i>	<i>DX-PFCS01</i>	<i>1A</i>
<i>WW02</i>	<i>WASTE WATER</i>	<i>INFLUENT SAMPLE</i>	<i>↓</i>	<i>↓</i>	<i>2A</i>

<b>* Required information</b> Comments/Additional Information:	Received By (Name): * <i>K. Chamberlain</i> Signed By: * <i>[Signature]</i>	8:00am 08/08/18 A <input type="checkbox"/> 2 <input checked="" type="checkbox"/> NZ Couriers LBA 09800897
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